ARCHIVES OF OTOLOGY.

RAILROAD ACCIDENTS IN CONNECTION WITH BAD HEARING OF ENGINE-DRIVERS.

By Prof. S. MOOS, M.D., of Heidelberg.

Translated by William C. Ayres, M.D., New York.

SINCE the discussion of this subject, called up by myself at the Otological Congress in Milan, my opinions of the effect of the deteriorated hearing of engine-drivers have been confirmed by many authors: among whom are Drs. Bürkner of Göttingen, Schwabach and Pollnow of Berlin. Pollnow has arrived at conclusions as to the dangers to the travelling public from this source, which, however, seem to render my observations of but little importance. Dr. Jacoby has come almost to a negative result, since in ten and a half years he has examined the ears of eighty engine-drivers and treated twenty of them. Of these, five had one-sided affections of the labyrinth, and fifteen had acute or chronic inflammations of the middle ear. Jacoby draws the conclusion, that the deteriorations of hearing which I have pointed out are not the rule, and states the danger to travellers is not so great from this source as from color-blindness. Dr. Hartmann (*Deutsche med. Wochenschr.*, No. 3, 1882) holds the same opinions as myself. He states that it is not alone necessary that the ordinary signals should be distinguished, but that there are other circumstances under which an engine-driver is placed which render hearing more difficult, such as running in storms, over a frozen track, and through tunnels, etc. According to his experience, there are again other conditions which cause an engine-driver, who already hears badly, to hear much worse

after having made a long journey (but recovers his hearing after leaving his engine).

I have vindicated my opinion when Schwabach and Pollnow asserted that those who can understand an ordinary conversation are able to fulfil the requisites of an engine-driver or fireman.

I have always had the subject in mind, believing it to be the greatest benefit a physician can do to expose certain dangers to the public, and combat them prophylactically. I could never familiarize myself with the idea that a certain defect of hearing might be compatible with a smooth working of the complicated machinery of railroads, and not involve great danger to the travelling public. On the contrary, there should be a very high standard demanded in order to reduce the numerous sources of accident.

On this question an English reviewer records the same opinion in the *Lancet*.[1]

He requires from railroad employés the highest acuity of all the senses, not only of the sense of hearing, and supposes that it is possible that the recent accident in Canonbury might have resulted from the engine-driver not having been able to hear the signal given by the signal-man.[2]

[1] The *Lancet*, No. xxvi, vol. ii, 1881, Dec. 24th. Engine-driver deafness. After giving the opinion of Pollnow, Schwabach, and myself, he continues: "Some hesitation may be reasonably felt in accepting this conclusion (viz., that as long as a conversation in ordinary voice can be heard their defect involves no danger to the public). Surely the engine-driver is often dependent upon his ear for other information than that derived from a fog signal or a starting whistle. Often an unwonted sound from some part of the engine is the first intimation that something has gone wrong with the machinery, the early recognition of which might be of importance. The signal by which passengers can communicate with the engine-driver appeals to the ear, and a slight signal amidst the noise of the train might be unnoticed by men with slight defect of hearing, although capable of being perceived by the normal condition of this faculty. So, again, in such an instance as the Canonbury accident, in which the signal-man states that he gave a word of caution to the passing driver, which the latter asserts he did not hear. Whether such warning was or was not heard, or its exact purpose recognized, might readily depend, in same instances, on the acuity of the sense of hearing in the driver. Railway systems are so complex and delicate in their organization, that those who work them need to have every sense in perfect operation. Pains have been taken to obviate the danger arising from color-blindness, and it is certainly desirable that investigations should be made to ascertain how far the effects on the hearing of engine-drivers produced in Germany are produced also in this country."

[2] According to a verbal statement made to me by one of the students of my clinic, Dr. Burnham, from Canada, who was in London at the time, three trains collided in a tunnel on this occasion.

Unfortunately he does not state whether this particular engine-driver was hard of hearing or not. Every one will agree that, even if the driver had normal hearing, the occurrence of the accident demonstrates the importance of perfect hearing in engine-drivers.

The remarks of our English reviewer are certainly correct and convincing.

A similar accident happened in France, in October, 1880, fortunately without loss of life, but with a very great impediment to travel. I quote the facts as they were related in the French newspapers: "Le Journal de l' Aisne rapporte un fait peutêtre sans précédent dans les annales des chemins de fer:

"'Mercredi soir le train de huit heures vingt et une minutes, qui ramène les voyageurs partis de Paris à cinq heures trente, entrait en gare de Provins attendu impatiemment, comme tous les jours, par une centaine de personnes.

"'Le chef de gare, les employés, tout le monde ouvrait des yeux écarquillés ; seuls, le mécanicien et le chauffeur continuaient à s' approcher en serrant les freins, avec la tranquillité que donne la quiétude d' un devoir accompli. Ce n' est que quand la machine eut stoppé qu' ils commencèrent à se rendre compte de l' ébahissement de la foule. La locomotive, son tender, et le wagon de bagage étaient venus seuls de Longueville; on avait tout simplement oublié d' accrocher le train.'"

The accident happened at night, and, since it was dark, unless we consider that both driver and fireman slept the whole length of the journey, we must conclude that they were so far defective in hearing that they did not know that the peculiar noise made by a train behind them had ceased.

How necessary normal hearing is in certain railway accidents is shown by the following case which I only recently had to examine:

Andreas Schneider had been an engine-driver for seven years, was stationed in Karlsruhe and had never been on a road where there were tunnels. He consulted me on January 19, 1882, and re-

lated the following: On December 23, 1881, while on the journey from Karlsruhe to Rastadt, a cock was blown out by the steam at 5.30 A. M.; on account of this there was a terrible hissing at the locomotive, in order to stop which the fire had to be taken out of the furnace. "After I had done this we started toward Offenburg. During the first half hour I had severe pain deep in both ears, which then passed off and did not return." He said he had noises in both his ears, like the chirping of a cricket, but more on his right side than on his left, which continued up to the time of consultation. From Rastadt to Offenburg he did not hear the pumping noise which the engine makes in forcing the water from the tank into the boiler, so that the engine-driver had to attend to his duty for him. He could not do it himself until daylight came. Even then he could not hear the noise of the pump, but by means of his vision he could see that no water was lost while the pumping was going on. Since this time, has not been on the engine.

Examination showed: bone-conduction preserved only for C′ turning-fork on the forehead, being wanting for a watch which should be heard at 10 metres. He heard the watch at 0.15 with his left ear, and 0.10 with his right. Whisper =1 metre on both sides. Both drum-membranes showed total opacity of their mucous coats. Nothing else abnormal. Only sixteen days had elapsed between the time of the accident and my examination, so that we are forced to conclude that the ear was not a normal one for a long time before the accident. The accident had probably caused a bilateral labyrinth affection, either in the form of an exudation or a hemorrhage, which caused the sudden occurrence of the subjective symptoms and the deafness for higher and lower tones, while the perception for the middle ones remained. This fact makes the diagnosis of hemorrhage probable, and also that the middle convolution of the cochlea remained free.

Applications of Politzer had no effect. Injections of carbonate of soda into the drum-cavity from January 14th to February 2d, caused a diminution of the subjective symptoms, while the tuning-fork symptoms remained the same, but his hearing for the voice was much improved. He heard a loud voice at 1½ metres. He was declared to be permanently unfit for duty.

That extraordinary circumstances, such as high wind and storms, can cause the signals to be misunderstood in persons who already hear badly (Hartmann), I can show by a case which I have examined very recently.

Emil Lapp, æt. 32, a reserve engine-driver came to me, "because he did not wish to be guilty of any neglect of duty in the future." He had been employed for two years, but had never been on duty on a mountain road. He was uncertain in his manœuvres when the wind blew, or in a storm, and under such circumstances he had lost confidence in himself. "At night I can orient myself by the colored signals, but in the daytime I have to rely on the fireman, who hears better." I must say that he understood a conversation at 2–3 metres perfectly at his first consultation, and in this respect he improved under treatment, so that I was finally able to declare him capable of doing duty on his engine.

Sometimes the optical signals can not be made out by the sharpest eyes, as in a fog, and in such cases the ear must be appealed to for signals, as a matter of safety.

The following furnishes an illustration of this, which I take from one of our newspapers; a telegram from London, January 20, 1882: "The unusually thick fog of yesterday caused many accidents, the worst of which was a collision at Horney Station, North London. The fog cleared up near evening, but reappeared so suddenly that the fog signals could not be prepared quick enough. A train from King's Cross for Enfield was standing at Horney Station; a following train from Barnet, whose engine-driver could not have seen the signal to stop, ran, with half speed, into the front train, and wrecked the last car, which was crowded with laborers returning from work. Two people were killed; eleven severely, and as many more slightly, wounded." From this short list of accidents we must certainly come to the conclusion that an engine-driver should possess all his senses in a perfect order. For the safety of the travelling public, and for the prevention of accidents on railroads, not only a certain minimum of hearing is to be required, but both sight and hearing should be perfect since sometimes

reliance must be placed in one, sometimes in the other, and often in both combined. By such requirements only can danger and accident be reduced to a minimum; in this connection we may say to the directors of railroads: "Videant consules ne quid detrimenti res publica capiat." (The consuls have to see that the commonwealth suffers no detriment.)

ON THE FORMATION OF A NEO-MEMBRANE IN THE DRUM-CAVITY, RESULTING FROM HEMORRHAGIC PACHYMENINGITIS.

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by William C. Ayres, M.D., New York.

THROUGH the kindness of Prof. J. Arnold we have had an opportunity of examining the two temporal bones of a man who died in the clinic at Heidelberg, of homorrhagic pachymeningitis.

For the symptoms during life we are indebted to Prof. Fürstner as follows:

The patient did not exhibit any loss of hearing, but complained of noises in his ears, and similar sensations to those in his head. He was admitted on account of well-developed hypochondria, with periodical seizures of great anxiety. Attention was called to an organic brain lesion by a severe attack of apoplexy, the consequences of which, however, soon disappeared. After some months he had another attack, exhibiting stupor, frequent vomiting, choked disc on both sides, and rapid emaciation. A tumor or hemorrhagic pachymeningitis was diagnosticated. It must also be remarked that he had an extensive hemorrhage into the optic-nerve sheaths, the incarceration of the optic nerves producing choked discs.

Post-mortem Notes.

Mathias Schwieg, laborer, æt. 56, from Neckarelz. Died May 26, 1881, at 1 A.M. *Post-mortem* May 26th, 10 A.M.

Great rigidity; skin white; numerous death spots. Slightly developed painniculus adip. Muscular system well developed. Strong skeleton. The dural sac of the spinal column distended, containing much clear, serous fluid. Pia mater clear and transparent on its anterior and posterior surfaces, somewhat injected on its posterior surface. Substance of the spinal cord of normal consistency and moisture. Posterior portion somewhat congested. White and gray substances normal.

Skull thick, compact, and well supplied with blood; dura mater adherent only in isolated places.

Longitudinal sinus empty. On cutting through the dura a sac was found which could be detached from the dura toward the left side. It fluctuated, and seemed to be filled with a dark bloody fluid mass. It was evidently the abnormal arachnoid, which showed several layers that were rich in blood-vessels, and contained hemorrhages between them. The sac extended from the point of the frontal lobe back to the occipital lobe. The surface of the brain seemed flattened throughout the extent of the sac. A similar sac was found on the right side, but much more distended. The surface of the brain was more flattened on this side.

The pia of both sides of the cerebrum was somewhat thickened, cloudy, and was detached with difficulty from the brain. The brain substance contained but little blood where it was flattened, but was not otherwise changed. Both lateral ventricles greatly distended, and filled with a red fluid. In the anterior and posterior parts of the left optic thalam., and also in the two corp. quad., were numerous small hemorrhages. The brain substance very soft, and in places spontaneously running together. The other conditions, which are not important to us, we will omit and pass on to the

Anatomical Diagnosis.

Pachymeningitis hemorrhagica int. Hæmatoma duræ matris. Compression of the brain. Hydrocephalus int. Old cicatrices in spleen. Œdema and hypostasis of lungs.

Results of Examination of Both Temporal Bones.

After having separated both pyramids from the temporal bones they were decalcified, and examined according to the method previously recorded. In both were found bone nuclei (already described), which greatly disturbed the decalcification and the subsequent examination. There was one in the right side of the roof of the vestibule 8 *mm.* long and 2 *mm.* broad. In the left there was one on the posterior wall of the vestibule which surrounded the union of the sagittal and frontal semicircular canals.

Condition of the Blood-Vessels.

In both temporal bones the adventitia of the branches of the int. audit. artery had a glassy appearance (it did not color with carmine), and showed ring-like swellings. On the left side there was a concretion of phosphate of lime, which was intimately attached to the wall of the vessel.

The blood-vessels (both in the labyrinth and the whole bone) were filled with cubical-shaped blood corpuscles showing long-standing stagnation. *We found fresh extravasations of blood only between the nerves at the base of the left modiolus.*

Pigment.

Small brown, round pigment granules were on the outer wall of the utricle, the sagittal and horizontal ampullae, besides black pigment particles and a larger, kidney-shaped yellow-brown pigment lump at the sagittal ampulla. Red-brown pigment corpuscles of varying size and shape were at different places in the connective-tissue layer of the walls of the ampullæ, in the sheath of the facial nerve, and in the periosteum of the vestibule of the left ear. In no place were there cells containing blood corpuscles, or changes of the nerves, and the membranous parts of the labyrinth showed no other alterations than those mentioned above.

Middle Ear.

The pneumatic spaces in the right pyramid were remark-

ably large, and those of the left sclerosed (also the squamous portion of this bone was hyperostotic). At the base of the left temporal bone, and also on the roof of the left tympanic cavity, there were dehiscences. Both the drum-membranes showed peculiar conditions. There was a neo-membrane covering the whole mucous tract. It extended from the mastoid antrum to the ostium tympanicum, and covered the floor of the drum-cavity, the labyrinth wall, the ossicles, the tensor tympani, and the neurolemma of the chorda. It was removed from them only with difficulty with the forceps. This new membrane was red (like brick) and showed well-marked circumscribed hemorrhages to the naked eye, as, for instance, on the promontory and ostium tympanicum, and the floor of the drum-cavity. The mucous membrane of the two drum-membranes alone showed no traces of this new membrane.

The external surface of the membrane of the round window was infiltrated with pigment corpuscles and nuclei. The entrance to the left round window was completely filled with a yellowish-brown mass, which was shown under the microscope to be composed of blood corpuscles and round yellow globules. These globules contained fine needle-shaped crystals (margarine), and, consequently, were probably formations of fat.

The Structure of the Neo-Membranes.

The ground structure of these membranes was made up of light, finely fibrous, wavy connective tissue, with a few oval or spindle-shaped nuclei. This tissue surrounded large and small meshes of blood-vessels. The vessels themselves were, for the most part, small, but sometimes of broad calibre, and of uniform size with rare club-like enlargements. The small vessels, which were filled by a single row of blood corpuscles, had the anatomical structure of capillaries; the larger ones, whose walls showed a continuous row of nuclei, were the so-called transition vessels. There were no traces of new-formed arterioles. They were all filled with blood corpuscles, and in some of them the white blood corpuscles predominated. Along the course of the vessels, and

in the interspaces between them, we found numerous small extravasations of blood. These were both of old and recent origin, and in some of them, especially the old ones, there were processes of pigment-metamorphosis going on. The pigment was, for the most part, in irregular black lumps.

The Genesis of the Neo-Membranes.

According to Kremiansky, in hemorrhagic pachymeningitis the morbid process follows the course of the meningeal artery, and since the tympanic cavity derives at least a part of its nourishment from this artery, we can consider the membranes as a result of the disease, which goes by preference along certain blood-channels. We can not reject this view, if we bear in mind that the transmission of a disease of the dura mater is rendered more easy by extensions of the dura into the middle ear in several places, of which the one which passes through the fissura petro-squamosa is the most important, and in children contains blood-vessels. Taking all these conditions into consideration, we are rather inclined to oppose the opinions of those who look upon the blood extravasation as the primary cause of the pathological formations in hemorrhagic pachymeningitis (Huguénin, Ramaer, Sperling).

Diagnostic Value of the Neo-Membrane in the Tympanic Cavity.

We have seen above that the diagnosis of the process in the brain was uncertain, as it was either pachymeningitis hemorrhagica or an intracranial tumor. As the diagnosis of the tympanic disease just described can be made with the otoscope on account of the peculiar mixed color of the drumhead, it may be of great service in settling the diagnosis of hemorrhagic pachymeningitis.

A CASE OF COMPLETE UNILATERAL DEAFNESS AFTER MUMPS, WITH CRITICAL REMARKS.

By G. BRUNNER, of Zurich.

Translated by William C. Ayres, M.D., New York.

THE recent publications of Dr. Buck,[1] Profs. Roosa,[2] and Moos[3], and others, have induced me to communicate the following similar observation.

Our experience on this subject is very small, and we have not been able to describe the exact clinical picture, even apart from the obscurity in which the pathologico-anatomical conditions seem to be involved.[4]

Even in the extensive German text-books we can find no mention of such a condition, with the exception of a notice by Moos and Urbantschitsch, where, in a labyrinth hemorrhage, they refer to a *post mortem* specimen after mumps, by Toynbee. In Toynbee's book on ear diseases, we find the following:[5]

"The peculiar poison which is often known under the name of mumps, is frequently the cause of complete deafness, which is generally manifested only on one side. In such cases the nervous apparatus is often affected, since the *deafness occurs suddenly, and is generally of long dura-*

[1] These Archives, vol. x, p. 274. [2] Same. [3] Same, vol. xi, p. 13.

[4] If Roosa has really seen so many cases of such deafness after mumps as he implied in the discussion of Buck's cases, I am very sorry that he has not furnished a more minute description of them. I do not know of any case except the one I record, and even this is not a conclusive one, since the patient had had syphilis 13 years before.

[5] The American literature I have not at my disposal.

tion; as a rule, there are no symptoms of disease in the external canal, the drum-membrane, or drum-cavity."

My own observation (of the year 1871) is as follows:

A healthy country girl of 30 years caught mumps in a village, causing a considerable tumefaction of both parotid glands. Soon after she had vertigo, with noises in her right ear like running water. The vertigo increased, and at evening she said she did not hear with her right ear. She remained in bed 8 days, during which time the swellings went down, but the noises and the vertigo remained. When she left her bed she reeled like a drunken person, so that she was ashamed to go on the street. She gradually lost her vertigo, but the noises and the deafness of her right ear remained. On examination the left ear was found normal. In the right ear the drum-membrane was normal, as also the Eustachian tube. The large tuning-fork C′ was not heard before the right ear, and from every point of the head only heard with the left ear.

Examination with the constant current unexpectedly showed on the right side the normal formula with humming of flies at xxiv, 60-100. A D had no influence on the pathological noises.

Internal administration of iodide of potassium had, as was expected, no effect.

A comparison of the five foregoing cases gives us the following symptoms and course of the disease:

1. The nervous deafness after mumps can be one-sided or double-sided, the former being more frequent (3 in the five cases).

2. It is complete, and, according to past experience, is incurable.

3. It develops rapidly in all cases (that is, in a few days), with vertigo and subjective noises, the latter symptoms lasting a long time.

4. There is little or no fever, as it was not noted in any of the above cases.

5. Pain is never or very seldom present; it is only recorded in one of Buck's cases.

6. Consciousness is not lost, nor is there any other symptom present except the excessive vertigo.

7. It happens in children and adults; in the majority of the reported cases it was in the latter.

As is evident the disease has many similarities to Voltolini's and Ménière's disease, but is more like the former than the latter. The vertigo, staggering gait, and subjective noises are common to all three. It differs from Voltolini's disease in the absence of fever, the slight disturbance to the general condition of the patient, and the absence of psychical excitation (coma, etc.), and also in that the deafness after mumps is generally one-sided, while V.'s disease is generally bilateral; the latter seems also to occur only in children. The difference is therefore more quantitative than qualitative, which may be accounted for by the ages at which they occur. It is therefore necessary in morb. Voltolini to exclude epidemic parotitis.[1]

Toynbee[2] has already located the disease in the labyrinth, which is most probably correct. How it gets there we do not know. Roosa's opinion that it goes from the canal into the tympanic cavity, and from there into the labyrinth, is combated by the fact that neither the canal nor the tympanum are affected.

Combeau[3] considers parotitis a general affection with many localized manifestations, and argues against the metastatic theory, saying that he has made observations which show that the conjunctiva, the mucous membranes of the throat, urinary passages, and vulva become inflamed in the course of mumps. He has also often observed that there is sometimes a complication of the testes in mumps. If we consider, as seems probable, that in our case there is an analogy between it and the parotitis, like that between mumps and disease of the testes, we would reduce it to an inflammatory excitation of the labyrinth, which leads to rapid and copious exudation without inclination to suppura-

[1] In the case of children the question in both diseases is as to an *infectious labyrinthitis with rapid serous exudation.* This is a suggestion which I purposely underscore. If we think of a labyrinthine hemorrhage in Ménière's disease, we could explain all three conditions by considering that there was a rapidly increasing labyrinth pressure.

[2] He speaks of a complete disorganization of the nervous apparatus in the labyrinth, and of a dark-colored fluid in the vestibule and cochlea. I regret that his descriptive catalogue is not at my disposal.

[3] Vogel in *Ziemssen's Handbk.*, vol. vii, 1, p. 103.

tion. This would agree with all the symptoms, since the short course and the absence of disturbance to the general condition forbid any idea of suppuration. It does not appear strange that a rapid exudation, in spite of its innocent character and tendency to absorption, should have a fatal effect on the delicate tissues of the labyrinth.

It appears interesting to me to follow the comparison of the testes complication : a certain identity of both complications can not be mistaken. Orchitis[1] generally begins on the 6th, 7th, or 8th day after the appearance of the mumps. The testes remain swollen for several days after the tumefaction has disappeared from the parotids. The fever, which has generally disappeared by this time, commences anew, and remains for several days, but is not so high. The symptoms are no longer very troublesome, notwithstanding the great swelling of the testicles (sometimes 2 or 3 times the normal size) with which an acute hydrocele or œdema of the subcutaneous cellular tissue is combined. *In the majority of cases only one testicle is swollen*, and generally the right one. The course of the orchitis is analogous to that of the parotitis (and, we may also add, to that of the ear affection), namely, 3 to 6 days on the increase, and subsiding just as rapidly, disappearing in 1 or 2 weeks. Vogel says, "That in this case, as in mumps, the exudation can only be serous, we may conclude from its rapid and certain absorption." Nevertheless, we find in certain epidemics that total atrophy of the testicle occurs.

[1] Vogel, *A. A. O.*

SUPPLEMENT TO PROF. MOOS AND DR. STEINBRÜGGE'S CASE OF HYPEROSTOSIS AND EXOSTOSIS, ANKYLOSIS OF THE HEAD OF THE HAMMER, BONY CLOSURE OF THE ROUND WINDOW, COLLOID DEGENERATION OF THE ACOUSTIC NERVE IN THE TEMPORAL BONE OF AN 80-YEAR-OLD MANIAC.*

By Prof. ALBERT BURCKHARDT-MARIAN, of Basle.

Translated by William C. Ayres, M.D., New York.

ANATOMO-PATHOLOGICAL examinations of cases in which we have examined the hearing during life, are means which will allow future generations to build up a more exact pathology of the acoustic nerve than we can at present. With this view in mind I think that the following is not without interest.

The sentence, "the hearing acuteness was but little diminished," which occurs in Moos and Steinbrügge's case, may be corroborated by the following fact in the history of the case, kindly furnished by Prof. Wille.

1. Hallucinations occurred for the first time in May, 1875. Before this the patient had never suffered from any subjective ear symptoms.

2. She entered the lunatic asylum on March 4, 1876, and stated that she had never had any ear disease. At this time she heard well.

3. She had hallucinations for a long time, of such a character that she thought some one was sitting close to her on her left side and calling her.

* These Archives, vol. xi, p. 9.

4. With her left ear she did not hear the watch either on contact with the ear or mastoid process. On the right she heard it at 9 *cm.* but had no bone-conduction (May 18, 1877).

5. Notwithstanding the small amount of hearing in her left ear, her deafness was not conspicuous up to the time of her death.

From the foregoing it appears that at the time of her entrance into the asylum her hearing was normal, and that she had never suffered from any ear affection. Five years before her death she had hallucinations, and referred them to the left ear. Three years before her death she did not hear the watch with her left ear, and with her right only at 9 *cm.* Bone-conduction destroyed.

No great degree of deafness could be determined.

Since Moos and Steinbrügge found ankylosis of the hammer, bony closure of the round window, and colloid degeneration of the acoustic nerve on the left side, they correctly concluded that there was absolute deafness on this side. In the asylum she did not give any symptoms during the latter years of her life, which would be opposed to such a view. It is to be expected that if a person 80 years old, who suffered from complete deafness of one ear, never showed any loss of hearing, the other ear would be found normal. This, however, was not the case, and for this reason I will briefly give the condition of her right ear.

Right Temporal Bone (alcohol preparation).—Dura mater thick, and with difficulty detached; bones everywhere hyperostotic and very compact. (Squama 7 *mm.* thick; just behind the sigmoid sinus 10 *mm.*) In the jugular foramen the jugular vein was separated by a small prolongation of the dura from the n. vagus, glosso-pharyngeus, and access. Willisii. The vestibular aquæduct showed a broad longitudinal fissure with thickened walls. Porus acusticus int. somewhat reduced in lumen. External canal and tympanum normal. The hammer was absolutely immovable with the probe. After removing the annulus tymp., the upper half, and the whole anterior and inferior walls of the tympanic cavity, the head of the hammer was found fastened to the tegmen tympani by a layer of bone. After carefully dividing the joint between the anvil and stirrup, a complete anky-

losis of the hammer-anvil joint, and also an absolute immobility of the stirrup in the oval window was found. There was no great change in the plate of the stirrup, except a whitish prominent boundary (chalky deposit in the annular ligament?).

The round window was transformed into a small groove by a bony layer on its walls. After taking this away the membrane was found much thickened. It had an oval form, 2 *mm.* long and 1 *mm.* broad, and was movable. The mucous membrane of the tympanic cavity everywhere thickened. The pyramid sclerosed (ivory). The modiolus was 3 *mm.* thick near its first convolution, and 2 *mm.* at its second. The microscopic examination of the acoustic nerve showed changes which, according to Moos, were the result of the alcohol in which the preparation had been kept. We therefore have *absolute ankylosis of ossicles*[1]; *reduction in size of the round window*, and *thickening of its membrane* in the case of a person of 80 years *who had no remarkable diminution of hearing.*

In young people, when the round window has its membrane normal, the bone-conduction may make some compensation for ankylosis of the ossicles, but that in cases where the bone-conduction is lost there should be good hearing, is very remarkable.

If the round window had been found normal, we could have concluded, that the drum-membrane was fixed and stretched by the ankylosed hammer, and thus was able to make small vibrations and conduct them to the membrane of this window. But the thickening of this membrane would certainly make such a supposition doubtful, although it seems to me still to be the most probable explanation of her good hearing.

There is one fact which we learn from this short communication, viz.: that from changes in the middle ear, even in a most decided form, we must be very careful about connecting such a condition with an *intra-vitam* deafness or deaf-mutism.

[1] Complete immobility of the foot-plate of the stirrup in the oval window on the left side, but mobility on the right; bony occlusion of the round window on the left, but on the right . . . continue in text.—K.

ON ARTIFICIAL DRUM-MEMBRANES, AND ESPECIALLY THE COTTON PELLET.

By F. GRAF, of Frankfort-on-the-Main.

Translated by William C. Ayres, M.D., New York.

AFTER reading Dr. Knapp's paper on the use of the cotton pellet in defects in the drum-membrane (these Archiv. vol. x, 1, p. 60), I have concluded to make the following communications from my own experience on the subject, and I do not doubt that other German surgeons will also testify to the advantageous use of the cotton pellet in quite a number of cases.

Case 1.—Mrs. M., 35 years old, had had otorrhœa in her left ear since childhood, and after pain, etc., had suffered from it for a week also in the right. She consulted me on May 12, 1881. On the left side she heard the watch at 15 *cm.* On the right, *ad conch.* Bone-conduction diminished. Tuning-fork on the forehead louder on the right ear. Whisper=0. Ordinary conversation, left, $\frac{1}{2}$ metre. Loud noises and vertigo. Rotates her head, and passes her hand over her forehead, as if she wanted to wipe something away, evidently striving to obtain some subjective diminution of her vertigo. Examination showed a large perforation on the left side; mucous membrane of the drum-cavity red, thickened, and but slightly moist. Right, also a large perforation (the size of a pea), with the same conditions of the mucous membrane of the drum-cavity, which, however, did not agree with the history of only an 8-day trouble. On further interrogation she said that she had had otorrhœa in this ear two years ago. In the course of the next few days the secretion diminished, and hearing was

better, but she still complained of noises and vertigo, especially on using the syringe. On May 28th a cotton pellet was adjusted in the right ear, apparently with but little result (watch 4 *cm.* and 2 *cm.* without it). Nevertheless, I let it remain, and May 30th she said she had heard better with it, and the vertigo had almost disappeared. The pellet was removed on account of a copious discharge, when she still heard the watch at 30-40 *cm.*, but this did not last. In the left ear the pellet produced no improvement. She was then shown how to put it in and take it out herself. On July 1st she heard a loud conversation at ½ metre without, and at 2 metres with, the pellet. I did not see her after that date.

Case 2.—Catherine R., æt. 18, consulted me on May 4, 1881. Had lost her hearing almost entirely after scarlet fever and typhus, at 10 years of age, and had had otorrhœa on both sides since that time. She had been treated several times, but without benefit. Heard a loud watch on contact with both ears. Bone-conduction good. Tuning-fork on the forehead equal in both ears. Whisper=0. Loud voice only at the ear. Both drum-membranes showed large defects downward and forward; mucous membrane red and rough. The handle and the remains of the drum-membrane attached to the promontory. No effect was ever obtained from Politzer. Had tried Gruber's artificial drum-membrane. The cotton pellet acted better, so that she could hear the watch at 4-5 *cm.*, and the voice at ½ metre, with the left ear, and was satisfied with it. When the cotton pellet became too dry, hearing was again reduced. I advised her to put in a fresh one moistened with glycerine, and to change it every 2-3 weeks. On Jan. 3, 1882, she had learned to adjust it herself, and used it afterward with good effect.

Case 3.—Wm. A., æt. 16. The left drum-membrane was entirely lost, and the mucous membrane of the drum-cavity appeared as if covered with epidermis. The right looked as if it were cicatricial tissue. The hearing on the left side was much improved by a cotton pellet moistened with glycerine. There was a great improvement on treatment, so that the cotton pellet was no longer wanted.

Gruber's artificial drum-membrane did not give so good results as the cotton pellet, although in the beginning I

used the former with preference (this consists of a thin India-rubber or linen disc with a thread attached to remove it). It is more irritating than the pellet, and its proper adjustment requires a greater skill on the part of the patient. Its effect was good in two cases, and doubtful in two. I will here add them.

CASE 4.—Mary W., æt. 19. Consulted me June 24, 1880. Hard of hearing for many years. Loud watch = 5 *cm.* right and left. Old inflammation of the middle ear, with perforation, on both sides. Artificial drum-membrane improved hearing, but was not used by the patient.

I regret to say that I did not try the cotton pellet in this and the following cases.

CASE 5.—Marie B., æt. 25. Consulted me Aug. 21, 1880. Had heard badly from childhood, after scarlet fever. The right ear showed otorrhœa with perforation. Left, dry perforation. R heard watch at 2 *cm.*, L at 10 *cm.* An artificial drum-membrane caused otorrhœa in the left ear, and had to be left off, but could be borne later. Discharged Nov. 24th, otorrhœa cured, and with relatively good hearing. (Watch 2 metres right, and 30 *cm.* left.)

CASE 6.—Heinrich H., æt. 40. Carriage driver. Consulted me Aug. 9, 1880. Perfectly deaf in the left ear for many years, and recently almost so in the right. Watch=0 on left. Right, *ad conch.* Heard tuning-fork on forehead. Heard the voice only when hallooed into his ear. Left drum-membrane entirely gone; mucous membrane pale and tough. Right, the same. Slight dry secretion in both ears. Politzer did not have the least influence. Put an artificial drum-membrane in right ear Aug. 28th, and the patient immediately heard better, which continued for some days. He learned to put it in and take it out himself, went home, and wrote me later that with the drum-membrane he could attend to his business, but without it he could not.

CASE 7.—Mrs. N., æt. 62. Consulted me Sept. 6, 1880. Had heard badly for two years, but her condition varied. Watch=0 right and left; heard only on the right temple. Tuning-fork on the forehead and between the teeth heard louder on the right side. Heard loud voice only with difficulty on the right side. Old perforation in both ears. No effect after Politzer. Heard the ordi-

nary voice much better near by with artificial drum-membrane. Discharged Sept. 10th. Did not see her again.

If I am to draw any conclusions from these few cases I would say, that the artificial drum-membrane is useful only in cases of large perforations, with a tough mucous membrane of the drum-cavity, where there is but little or no secretion, and great diminution of hearing. I think I can also testify to Moos' observation, that the artificial drum-membrane sometimes restores bone-conduction, but in one instance this was not the case. I also agree with Bezold that a layer of boracic-acid powder causes increased hearing by acting as an artificial drum-membrane. As a general thing, however, I am inclined to give the cotton pellet the preference. Its therapeutic effect is also in its favor. It does not seem to me to be of great importance whether the pellet is used dry or moistened with glycerine, vaseline, etc. This depends upon the peculiarity of each case.

ON AURAL AND NASO-PHARYNGEAL DISEASES, AND SOME OF THEIR METHODS OF TREATMENT.

A Posthumous Paper by R. SCHALLE, Hamburg.
With a Brief Preface by S. Moos, Heidelberg.

Translated by Isidor Furst, New York.

THE present paper of our collaborator, unfortunately too soon lost to science and to suffering humanity, was found after his death as a *manuscript sketch*, without any heading. It was an ardent wish of the deceased to render accessible and useful to the larger circle of his confrères the contents of the manuscript, being the experience in the treatment of aural and naso-pharyngeal diseases which he had collected in the extensive sphere of his activity at Hamburg. Many of the items had only been jotted down with the lead-pencil. A careful, probably not always successfully executed, revision was therefore required, in order to make the manuscript ready for the printer. The reader should kindly bear this fact in mind. Assuredly, many a part of it would have appeared in different *form*, if the deceased had had the opportunity of making his final corrections previous to putting it to press. Stern fate has decreed otherwise. Nevertheless, none of our esteemed readers, after perusal of this article, will deny to the deceased the testimony of strict objectivity toward himself and others; nor that he has succeeded in improving the frequently very difficult treatment of the affections in question, both by constructing new instruments and by

discovering new methods of treatment, and that he was equally *distinguished by conscientiousness as by knowledge.* In this respect, the present paper appears as a *permanent memorial* to the deceased. MOOS.

In the following pages I do not intend to discuss the entire therapeutics of aural and naso-pharyngeal diseases, but to restrict myself to some modes of treatment which have proved effective in my practice within recent years. I am well aware that but little will be new to many, particularly because what is here offered is intended rather for the beginner in our specialty.

As regards the *method of examination*, I still employ, to my entire satisfaction, my illuminating apparatus,[1] which has been materially improved since its first introduction. I use illuminating gas, to the great advantages of which I have already drawn attention in the second description (see note).

Of tongue-depressors, I believe Michel's to be the best: according to my view, it had better be grasped with the entire fist, the back of the examiner's hand being turned toward his face: in this way caution and force may be combined. Another practical depressor is that of Fränkel, especially for children; that of Türck is best adapted to operations under pharyngoscopy, the patient himself holding the instrument with his right hand.

Obstreperous, vigorous tongues may be most easily overcome, not by continued strong pressure, but by applying the depressor lightly and increasing the force slowly but deliberately, withal repeatedly yielding, then again renewing the pressure. Working thus interruptedly, we are less likely to be fatigued, and avoid causing pain or gagging. Still, it is rather tedious to the physician to continue this exertion in rapid succession. I have become fully convinced of that, here in Hamburg, where the tongues, I think, belong among the best-developed organs, being of

[1] First described in *Arch. f. Ohrenhlkde.*, x, p. 132; later in the Trans. of the 51st meeting of German Naturalists and Physicians, Cassel, 1878, sections xix and xx.

great breadth, length, thickness, and vigor to match.[1] I therefore felt constrained to construct a depressor for my own use, which should relieve me of the greater part of this labor, and chose for modification the well-known instrument by Ash.[2] In the first place, I transposed the joint to the rear, lengthened the director, and thus secured a wider range of applicability for higher and lower inferior maxillary bones. Secondly, I attached the tongue-plate movably, and in this way made it serve for different ages, sexes, and peculiar formations (long heads). Thirdly, I omitted the opening in the tongue-plate, through which the upward-curving tongue may project and prevent the introduction of the mirror. Fourthly, I had it deeply grooved to give a firmer hold; and, fifthly, for the same purpose I gave the plate a greater downward curve.

It is applied by fully drawing out the director, pushing the lower plate under the chin, laying the upper part upon the tongue, and depressing it by sliding the joint with the other hand along the director, and adjusting the length of the tongue-plate so as to grasp the tongue as deeply as possible; avoiding, of course, too near an approach to the root of that organ to prevent gagging. Then, while the speculum-hook is lifted, the upper part is moved still further down the director so as to secure the greatest feasible depression of the tongue, which is now firmly held, and the depressor keeps it immovable after having followed but few of its excursions. Thus, the most obstreperous tongue becomes subdued, and we can introduce the mirror without having previously unnecessarily fatigued ourselves. Besides, more room can often be gained by directing the lower end of the director with the left hand.

Respecting uvula-holders, I still adhere to the view previously expressed, that I believe them to be unnecessary, even injurious. The irritation of the pharyngeal muscles provoked by them renders nugatory the use of the additional room forcibly secured. The palate-hook recently

[1] This excellent physique of the tongue I believe may be ascribed to the good living of the Hamburgians, continued for several hundred years, thus greatly developing the organ subserving the sense of taste.

[2] Voltolini had previously modified it.

devised by Voltolini may be termed a great acquisition, because in difficult cases it generally allows us a sufficient view—a fact I can affirm from personal experience. Nevertheless, I should wish to see it reserved for such cases only, in order to save the patient the disagreeable sensation of traction on the soft palate.

In the majority of cases we attain our object at once by dexterous manipulation of the tongue-depressor and the mirror; in the remainder, the following is the proper plan and almost always effective. Whenever I have a case which is at all difficult, I abstain from immediate examination, and direct the patient to gargle with salt-water daily in the morning and at night, in the manner to be described hereafter, and then to depress the back part of his tongue with a rounded spoon-handle, at the same time observing his soft palate in the mirror; in this way he endeavors to place at rest the musculature of the pharynx, upon which he can exert, though not a direct, yet at least an indirect, will-power by means of practice and experience.

The gymnastic exercise of the pharyngeal muscles during gargling, and the habituation to the irritation of the foreign body (spoon), persistently continued, attain the desired object within a few days, rarely weeks, even in the most unfavorable cases (nervousness, abuse of tobacco and alcohol). But let the first examinations be executed rapidly and carefully, and let the patient be forbidden to practise, lest he irritate the parts in advance. If the first examination has succeeded, the subsequent ones may be speedily continued. Long and extensive experience has taught me that this simple method is the best. But it may be objected that in many cases there is no time for this practice. In such a case I have forced the procedure and usually secured good results. In the case of a professor from Königsberg, in whom great irritability was combined with malformation of the nose, rhinoscopy could be performed after four days' persistent practice. Where but a single examination could be had, I have tried the well-known auxiliaries for the forward traction of the soft palate, but with poor success; my more recent experience, however, has convinced me that Voltolini's palate-

hook *with groove* can be warmly recommended for rapid results in difficult cases. The fenestrated instrument is objectionable, because the soft parts penetrate from underneath and diminish the image, while the plain smooth hook without groove easily disturbs the view by lateral displacement. Nor should it be forgotten that there are patients who cannot bear the application of the hook at all, so that we can do nothing but accustom them to it by protracted exercise. Certain it is, that with increasing experience of the examiner the difficulties vanish in the same ratio. I think it impracticable to employ Whitehead's tongue-depressor for simple examinations (B. Fränkel): the somewhat tedious application of the instrument, the indescribably oppressive sensation it calls up in the patient (one should have it applied to one's self, as I have done, to understand it) soon make its frequent use distasteful to the physician. I should reserve it merely for operations.

Digital examination is but a poor substitute for rhinopharyngoscopy; still it is of great value in all cases where the latter is impossible, for instance, in too small or indulged children, in patho-anatomical difficulties, and in the rare cases of invincible irritability. I do not think it necessary, as Meyer demands, to examine with the right hand as well as with the left; I use the right alone, and quietly and fully palpate the entire pharyngeal space. It is advantageous to introduce the finger not in the middle, but behind the opposite side of the arch of the palate. Not alone children, but adults likewise offer difficulties in this mode of examination. Many, especially frightened children, being rather suspicious, will not open the mouth in spite of all coaxing. In order to secure this, the child's head is tightly clasped in the left elbow, *the thumb* of the right hand is applied to the anterior border of the masseter muscle, and the cheek vigorously pressed against the teeth, which causes sufficient pain to cause the child to open the mouth. At once the buccal mucous membrane is pressed between the two rows of teeth with the left index finger, and the examination leisurely continued; whenever the child bites, it first hurts its own cheek and, therefore, soon desists. After the isth-

mus of the fauces has been passed, biting is no longer to be feared.[1] Still, I have had cases in which I have pressed livid spots on children without their opening the mouth; it has also happened to me that they caught my finger and bit their cheeks till they bled. For very intractable cases Sachs recommended the following excellent and at the same time gentle procedure for opening the mouth: A hen's feather, which has been stripped except at the very point, is pushed back between the teeth and the cheek, and introduced behind the last molar into the oral cavity, penetrating toward the larynx. Violent retching at once ensues, the child opens the mouth, and nothing is required but to prevent its closure. The procedure of pressing the fingers between the teeth so as to keep the mouth open, in digital examination where only the finger is to be introduced, I believe to be more practical than the use of the various oral specula which usually require a directing hand.

Whitehead's instrument is particularly ill-adapted for use as a speculum in digital examination, because the parts in front of the mouth make the introduction of the examining hand still more difficult. In adults, it is appropriate to call attention beforehand to the disagreeableness of the examination, to prevent interference by their hands. In examining a child I always direct somebody to hold its hands, but to place himself sideways out of reach of the feet, which are often used by children with such vigor as to possibly cause serious injury to the assistant. The palpation of the nasopharyngeal space may then be leisurely proceeded with, but it is essential that it be gently done, lest the soft, yielding proliferations of the pharyngeal mucosa remain undetected. I pass over the remainder of the technique of digital examination as sufficiently described elsewhere.[2]

On *anterior rhinoscopy* I have nothing of importance to add to general knowledge; my efforts to invent a better nasal funnel than that of Duplay (Rober[3]) have thus far not been successful.

[1] Bites of that nature should not be underestimated; on one occasion I had to discontinue my office hours for a week on that account.

[2] B. Fränkel, etc.

[3] The addition of a speculum hook to this nasal funnel, according to Voltolini, I hold to be impractical; it relaxes too soon.

As regards the *treatment* of chronic inflammation of the naso-pharyngeal mucosa, it requires, in the first place, the following highly important general directions, for no result will be attained without careful attention to them.

1. *Avoidance of the inhalation of cold and hot air, dust and smoke, also of the ingestion of very cold or very hot, strongly alcoholic, or highly spiced foods and drinks.* Of these injurious substances the inhalation of dust and of air at unfavorable temperature is hard to prevent. However, it may be most simply effected by adopting a procedure which I constantly employ in affections of the nose, particularly after operations. I let the patients wear purified sheep's wool.[1] A small quantity is taken, formed into a loose pellet from which no fibre should anywhere project which would cause tickling, and pushed into the nostril. The wool pellet soon expands, adheres to the walls, and permits free passage to the air, but intercepts all particles of dust, products of combustion, etc., and warms the current, I believe, by retarding it without rendering respiration difficult. At first the presence of these pellets of wool is disagreeable to the patient, but he soon becomes accustomed to them, and after sneezing or vigorous blowing of the nose, quickly replaces the lost pellets by new ones, for which purpose he always carries a supply of wool. After operations on the nose, removal of polypi or of parts of the inferior turbinated bone, I believe such protection to be imperative. I employ the same kind of plugging for perforations of the drum-membrane after suppuration has ceased; it prevents the injurious effects of varying temperature and of dust, is not heating, and does not impair the hearing as cotton does.

To prohibit *smoking* altogether I do not believe to be correct, because the patients obey only for a short time and then smoke more inveterately than before; I rather aim to restrict them gradually to a minimum of perhaps three cigars a day. Blowing the smoke through the nostrils I be-

[1] Ordinary coarse sheep's wool is used, all locks are teased asunder, then it is carefully washed with lukewarm (not hot) water and soap. The addition of some ammonia to the water deodorizes it and removes the grease. It seems a good plan, although I have not done it hitherto, to immerse the wool for twenty-four hours in ten-per-cent. carbolic acid solution, and then to dry it.

lieve to be especially injurious, and insist on its discontinuance; cigarettes, too, seem to be very deleterious, the more so as they are generally consumed in large quantities. A Russian lady patient smoked about forty daily.

2. *Gargling*, at first with lukewarm salt-water solution, a teaspoonful to the half-litre, I hold to be the *first curative measure.* This gargling should not be done in the ordinary thoughtless manner, which is little more than a rinsing of the soft palate and oral contents, but is to be performed as follows. The patient assumes the horizontal posture,[1] so that the head is at least as low as the trunk; in this position he fills his mouth with lukewarm salt water, then stretches out his tongue as far as he can, and pulls it still further with his handkerchief; thus the gargling fluid drops behind the tongue into the lower pharynx; now the patient makes a guttural singing noise until he feels the soft palate in front of the liquid, then suddenly and forcibly throws his head forward and upward, thus forcing the water into the upper pharynx and nose, and, in some adroit people with wide nostrils, even out of the anterior nares. In this way alone, the mucosa of the naso-pharynx becomes rinsed and cleansed by the fluid. At the same time, however, the muscles underneath the mucous membrane are made to contract and in turn promote the function of the muciparous glands. This latter effect may be most clearly observed while using the rhinoscope for a prolonged time, as, for instance, on those operated upon, where the patient is continually persuaded to forcibly control the palatine muscles; we then see a great number of small delicate pearls exude from the soft palate which, continually increasing, present a peculiar aspect. After the patient has mastered this gargling, less indifferent drugs may be employed, such as potassium chlorate, alum, tannin, etc.

3. *As an excellent remedy I consider insufflations of silver nitrate.* I believe it to be unpractical to employ the same agent in solution, for, according to my view, we cannot thus

[1] It is not advisable to allow the patient to gargle while standing or sitting, because it is thus very difficult; at least in the beginning it should be done while recumbent, so that the patient should understand what is required; if thereafter he can accomplish it standing or sitting, he may do so.

reach the entire mucous membrane. Whether introduced with the brush, or—a more cleanly method—according to Richter, by means of a charpie probang, behind the isthmus, the constrictor of the pharynx will invariably press upon it and liberate the liquid. The mucous membrane is drawn into folds the upper edges of which become cauterized, while the intervening parts cannot be reached at all. Even if the *caustic brush* is advanced into the upper pharynx, its liquid has before this dropped out: at any rate we cannot speak of a thorough, uniform cauterization of the entire mucous membrane by this method. To inject solutions by various apparatus has the disadvantage that a portion of the fluid drops upon organs not intended to be touched, nor can a sufficiently uniform distribution be obtained, as the stream is always denser around the main jet. The employment of atomizing apparatus is better, although even they are attended by the above-mentioned disadvantage; moreover, it is very difficult, and possible only in some individuals, to get the canula into the pharynx without contraction of the muscles. Irritable subjects experience contraction when the canula is inserted merely through the nose.

These disadvantages are best avoided by the insufflation of finely powdered caustics—a method long employed by Störk and others. The peculiarity of my method of application consists in the employment of very simple powder-blowers by which the cauterization can be easily and certainly accomplished. The various apparatus devised, in which the medicament is propelled through rubber tubes by means of hand-ball or mouth, are ill adapted, because they soon become clogged by the adhering powder; because they spoil the drug by drawing back into the reservoir particles not expelled; and, finally, because their filling is complicated. Schrötter's glass tubes are better, but a large number of them must be kept on hand,[1] as, to avoid the disadvantages noted above, a fresh tube must be used for every insufflation. But even Schrötter's tubes are equally hard to fill.

[1] For instance, at present I have one hundred and thirty-seven in use. Immediately after use I immerge them completely in water in a tall glass. When a sufficient number has accumulated, they are cleaned by simple immersion in concentrated sulphuric acid, rinsing in water, and drying.

I employ plain glass tubes, such as may be bought of any dealer, of five to six millimetres external diameter, cut them into pieces from fourteen to eighteen centimetres long by nicking the tube transversely with a few strokes of the file and breaking it; such a piece I hold obliquely in the flame of a Bunsen burner, so as to heat it about two and a half or three centimetres from the end, and bend it, by pressing it on the table, at an angle of about forty-five degrees, the bent part measuring about two centimetres. If the bent portion is somewhat rough, I smoothen it by a few strokes of the file, because that part may come in contact with the pharyngeal mucous membrane. Thirty such tubes may easily be made in an hour. To complete them, I take a rubber tube about forty centimetres long, which of course is used for all tubes and is merely slipped over them, and thus have the simplest insufflator.

The lunar-caustic powder is employed in the following proportions: Silver nitrate to calcined magnesia[1] 1:30, 1:15, 1:10, 1:8, 1:6, 1:5, 1:4, 1:3, 1:2, 1:1. The trituration of both agents must be thorough, in order to secure uniformity. It is well to call the druggist's attention to this. When it is to be used, we scoop up with the glass tube from one of the boxes (which should bear the percentage number in large figures) as much as the bent portion will hold, insert the other end into the rubber tube, the opposite extremity of which is taken into the mouth, hold the glass tube in the right hand, depress the tongue of the patient by the depressor with the left, introduce the tube exactly like the pharyngeal mirror, if possible without touching the organs, behind the soft palate, and with an abrupt puff of air discharge the powder into the upper pharyngeal space. If the patient's nostrils are wide, a part of the powder almost at the same moment escapes through the anterior nares. When the patient is then examined with the rhinoscope, which is quite feasible in some individuals after the insufflation, we see the entire pharyngeal space and the choanæ as if dusted

[1] Calcined magnesia, on account of its low specific gravity, about one-fifth that of sugar, forms a good vehicle; besides, its slight solubility in water causes a diminished deposition on the walls of the glass tubes. (Mosetig recommended for the same purpose powdered meerschaum, silicious magnesia. —Moos.)

with flour. I do not believe that we can secure an equally intimate contact of the diseased mucous membrane with the remedy in any other manner thus far known. But we do not always succeed as easily. In irritable, nervous, intemperate, or old subjects, the muscles contract, by an effort of the imagination, without touching the mucous membrane, even when the tube is inserted into the mouth. In such patients the tongue is depressed, the glass tube introduced into the posterior pharynx, at any second ready to blow, waiting for the descent of the uvula. In most cases this does not take long, and when it sinks down the powder is blown. No time is to be lost, for the next moment the uvula might again apply itself above to the roof of the pharynx. This manner of insufflation requires some dexterity on the part of the physician.

But there are isolated rare cases in which the uvula is held up by the pharyngeal muscles with admirable energy, the patient on his part being too nervous to bear any prolonged manœuvres in his pharynx. In these we simply push the glass tube high up into the pharyngeal space, behind one of the pharyngeal palatine arches, and discharge the powder with strong pressure, in which case, of course, the cauterization is less complete. Sometimes the cauterization succeeds well if the patient is caused to enunciate "ong" during the insufflation.[1] Otherwise, I emphasize the statement that patients become habituated to this treatment just as they do to rhinoscopy, and acquire even a certain knack by which the physician's labors are facilitated.

Besides these cauterizations of the upper, we effect those of the middle and lower pharynx, by likewise awaiting the position of rest of the soft palate, in order to secure a sufficient insufflation of the parts situated behind the palatal

[1] I need scarcely add that we should always apply the remedy with some degree of caution, and be always ready to withdraw the tube quickly if necessary; also to make sure previous to use that the glass tube is free from cracks at the bend, lest it might break when inserted into the upper pharynx and produce disagreeable effects. As long as the tube is in the upper pharynx the patient usually retches and does not bite; but if it is still in the mouth, we would be out again in an instant, before a child—which alone would be likely to do so—could bite. But caution can do no harm, although nothing of the kind has happened to me in the last two years, despite numerous applications.

arches. In cases complicated with nasal catarrh, I add to the former insufflations those through the nares. In the latter, however, we must take care to introduce the glass tube, so that the bent portion intersects the longitudinal axis of the body at right angles, and be directed downward as far as possible in the nasal cavity, perhaps exactly toward the prominence of the inferior turbinated bone. Whenever the tube is turned upward, the powder penetrates into the frontal cavities, which then react for hours by violent headache. It may be mentioned, in passing, that while the charged instrument is within the mouth, we must abstain from breathing through the mouth or from speaking, otherwise the powder may be blown out prematurely, possibly into the patient's face and eyes.

It is self-evident that the *inflammation* of the naso-pharyngeal mucous membrane often extends to the *neighboring cavities in the frontal and sphenoid bones*, and there causes much trouble by the disagreeable intense frontal headache. Inasmuch as these cavities are very difficult to reach I have devised the following procedure by which I succeeded to cure three obstinate cases.

I made the patient sit down on a low chair (rocking-chair) and bend his head far back, had him insert his right thumb deep into the oral cavity, in order to press the soft palate into the upper pharynx and thus to occlude the openings of the tubes. I then filled the nasal cavity with a very weak silver-nitrate solution (0.1 : 100.0). In this position, especially if the patient moves his head laterally, the solution penetrates into the cavities of the sphenoid and ethmoid bones; then the patient closes his nostrils with his left hand, and, while throwing the head forward until the face is directed toward the floor, releases his right hand. The solution now penetrates into the frontal sinus, and the patient makes a few lateral head motions, after which the fluid is allowed to escape. In this manner the diseased mucous membrane of the cavities named comes into sufficient contact with the remedy. Moreover, the patient himself has the sensation of the successful cauterization of the frontal sinus; I was unable to demonstrate it of the

basilar and ethmoidal sinuses. The concentration of the solution is very gradually increased; intermissions being necessary from time to time to enable us to observe the possible effect. Where we have to deal with catarrh of the frontal sinuses alone, the Politzer treatment as recommended by Hartmann may first be tried, although I have not hitherto seen any good effects from it. As to the disadvantages of insufflation, they are chiefly the pains felt by some nervous persons in rare cases for hours, even half days, probably caused by the penetration of particles of powder into the neighboring cavities, which may happen even in simple insufflation from the pharyngeal space. Another disagreeable phenomenon is the immediate occurrence of profuse secretion of the entire naso-pharyngeal mucous membrane, which may persist for hours. The patients may need from six to eight handkerchiefs[1] until the end of the flow. But it is just this profuse secretion to which I ascribe the curative effect.

Now and then it will happen that the powder penetrates through the tubes into the middle ear, as is demonstrated by the patient's sensation and a subsequent inspection. Thus far I have seen no ill effect from it, although the accident has occurred in several of my cases. The strength of the powder is increased slowly. I cauterize three times per week.

As such cases are usually accompanied by copious suppuration, the cauterizations should be preceded by syringing; for only after thorough cleansing can the remedy actually come in contact with and act upon the diseased mucous membrane, which should, moreover, not be too wet in consequence of the syringing. For the latter purpose I let the patient carefully syringe the pharyngeal space on the same day of and previous to his coming, observe the effect rhinoscopically, and if necessary cleanse again; I then let him wait some minutes so as to have the adhering water run off as much as possible, before the cauterization is made. Of course, this is rather laborious, but the effect amply repays for the trouble.

[1] Attention should be directed to using valueless handkerchiefs, as the silver-nitrate powder causes stains.

I am fully convinced that a large percentage of the unsuccessful treatment of naso-pharyngeal diseases is to be ascribed to the neglect of this simple manipulation. The fact that it usually requires considerable trouble to thoroughly cleanse a naso-pharyngeal space is certainly chiefly to blame for it.

In order to be convinced, it is only necessary to examine a subject little sensitive to rhinoscopy both before and after an ordinary nasal douche, and it will be found surprising how much has remained behind in the ridges of the recesses, between the prominences of the tubes, and the upper choanæ, especially in persons whose os basilare has a strong upward curve. In a few cases I only succeeded, by introducing a curved probe under rhinoscopy, in removing such accumulations of pus, beneath which, of course, I then found a freely granulating surface. What use, in such cases, is it to insufflate, brush, etc.? That touches only the pus, not the diseased mucous membrane.

While I formerly used the nasal douche, and later the English syringe recommended by Michel, I have, for about a year past, also abandoned the latter, because it often needs repairs, especially as, being factory-made, the quality is not always uniform. Besides I intended to have the force of the stream, if possible, completely under control of the patient, to enable him to increase, diminish, or interrupt it at any moment. With the abrupt discharge of the English syringe, clysopomps, etc., this is not at all, and in Weber's douche only imperfectly, possible. I therefore had a tin syringe cast to contain one hundred grammes, sufficiently thick to require but a short piston which every small lady's hand even could grasp. The syringe, which at the same time is provided with a short projection for aural injections, has attached to its point a rubber tube about fifteen centimetres long, and armed with an olive-shaped nozzle.[1] To use it, the patient introduces the olive-shaped nozzle into the nose with the left hand, while the thumb of the right is inserted into the piston ring, the second and third fingers into the other two rings, then the right hand slowly,

[1] As the syringe is rather heavy, and does not permit inspection of its contents, I intend to try a similar article of glass, provided with a shield.

but with increasing force, pushes the piston home. The main point is that the nozzle be directed strongly downward into the nose, that the stream may irrigate the lower and middle meatus. Otherwise the ordinary, much-discussed rules of the nasal douche are followed. I have invariably convinced myself that patients, particularly those with hard crusts in ozæna, had cleansed their naso-pharynx more thoroughly with this syringe than with the douche or the English (posterior nares?) syringe. In order to empty this as well as any other syringe most completely, it is essential to commence with a slow pressure, which is to be quickly increased to a force which accelerates the stream. However, it is easily learned, despite this procedure, how to empty the syringe at once, or half, at pleasure. Like others, I take the precaution to give my patients printed directions for nasal syringing. Under the above-described treatment with silver nitrate, which I have followed for two years, I have witnessed more rapid cures of naso-pharyngeal catarrh than by any other method known to me.

In chronic nasal catarrh uncomplicated with material participation of the pharyngeal mucosa, the *galvano-caustic treatment* is to be chiefly commended, the mucous membrane being cauterized with a thin spatula burner. Usually, however, a brief treatment with silver nitrate must be superadded, it being impossible for the burner to follow the variously irregular nasal bony framework invested with mucous membrane, which may be easily accomplished by the insufflation of the *caustic* powder.

Here I beg to insert some remarks about *galvano-cautery*.

Since 1871 I have used the zinc-platinum battery of Voltolini, and must confess that it has never failed, but has always done me the same service by equal attention. Nevertheless, its well-known drawbacks—concentrated acids, etc.—caused me to hail with pleasure the battery published by Bruns in 1877. From that time forward, I have performed numerous operations with it (but with the employment of the modifications described below) which comprised all the procedures known to me in the naso-pharynx and ear (exclusive of the burning of foreign bodies), and I think thus

to be entitled to an opinion as to its value. It is to be recommended in every way. Within the last few years, guided by experience, I have added to it what I consider to be improvements, which I will describe, presupposing familiarity with the original construction as described by Bruns.

First, I greatly increased the surfaces of contact between the carbon and the conduction, by applying to the upper ends of the elements a brass covering two centimetres in width, whereby the current is conducted directly without further intermediate connection by screws or other contacts; the conductions, therefore, being no longer dependent upon two small female screw-heads. Furthermore, I joined the zinc plates permanently by a pin, which here also leads the current without intermediate conduction. The hooks in the carbon and zinc plates formerly serving for conduction, now simply hold the elements in place. While in Bruns' battery (of two elements) there were twelve transmissions: two by soldering, four by contact, six by screw contact, there are in my modification only ten: four by soldering and six by contact. Aside from saving two transmissions, we have the advantage of dispensing with all screw contacts. I believe the screw junction the worst, because contact with a screw, which must be movable in its socket, cannot be as intimate as in contact procured by firm apposition. The longer a screw is in use, the looser it becomes by abrasion and polishing, thereby increasing the defect.

Another improvement is, that the battery is no longer set to one fourth, one half, three fourths, four fourths of its effect by elevation, but that I can produce an immersion from one centimetre to totality by a crank and toothed wheels. This enables me to bring to incandesence the finest burners for operations on the drum-membrane, as well as the coarsest applicable in the naso-pharyngeal space. With Bruns' deep immersion of even a single fresh element, the former fine burners would melt. It is evident that I save a great deal of power by such graduated immersion.

Finally, I have followed Stöhrer's advice to dissolve a portion of sulphate of suboxide of mercury[1] in the fluid. This

[1] I take 40 gms. to 4 litres of solution.

is best effected during the addition of sulphuric acid, as the suboxide dissolves more easily in the warmed solution. With the use of this preparation the zinc plates are long preserved, as during the activity of the battery mercury is deposited upon them; the solution also lasts longer.

By employing conducting cords composed of fine copper wire coated with silver[1] I expect to increase still more the power of the battery, the action of which has been materially increased by the above-described improvements. The care of the apparatus is given in the papers previously referred to. I only wish to point out that a bath is to be strongly recommended after repeated use. With me the elements are immersed every evening, if they have been in use at all, in two reserve glasses filled with warm[2] water. When the solution has become exhausted, the elements should be subjected to a general cleansing, after they have been three times immersed in water baths lasting each from six to eight hours, so as to remove thoroughly all the chromic combinations. When the elements are taken apart, the carbons are carefully washed, all metal parts cleaned with fine emery paper, of which various grades (000, 00, 0, 1, 2, 3) are kept on hand; the plate is newly amalgamated with mercury,[3] and after careful drying, requiring about 24 hours in a warm place, all parts are again put together.

Inasmuch as for the purpose of such thorough cleansing the battery is rendered unserviceable for two days, it is desirable to keep two reserve elements, which may at once take its place, and have besides the advantage of enabling us to exhaust weak elements, the substitute being on hand if an especially strong current is required.

Finally, I emphasize particularly that a correct service of the battery depends materially on very good care.

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[1] Pure silver wire is too expensive, even the plated wires costing double the price, but of course they act still better. (Tyndall.)

[2] Hot water is not practicable, as I have been informed by an artisan, because the upper part of the carbon plate contains wax, which would become softened and pass farther down.

[3] This may be done most quickly and thoroughly by pouring on the cleansed plates dilute sulphuric acid (1 : 6), followed by mercury, allowing it to cool, and then firmly rubbing it into the plates by hand until they are as bright as a mirror. They are then set up to allow the superfluous mercury to drain off.

Of handles for the loop I can recommend three—the universal handle of Bruns, the cutting-wire handle of Schech, and a handle which may at the same time serve for all the other burners I employ. The last, as regards size and heaviness, is intermediate between that of Bruns and Schech. Leaving a rather large loop, the wire is first drawn through the tubes; its ends are then inserted into the clamps of the handle; they are then passed on both sides through the holes in the axis of the margin, and simply bent sharply around; the superfluous lower ends of the wire are then cut off, and the loop drawn in by means of the ivory end to the required size. The handle is grasped in the fist; the third finger controls the ivory knob for the closure of the current. If held in the right hand, the thumb will turn the wheel by drawing it in; in the left, by pushing it away. With bent loop-tubes, the latter must have a right or left inclination, according to circumstances. The advantage of this instrument consists in this, that, owing to its construction, it acts only for brief periods at the time, so that the highest degree of the heat employed is constantly interrupted. On the other hand, the handle has the disadvantage that when employing steel wires the snaring progresses slowly, and that the steel wires easily burn through. Its application will be again touched upon farther on.

As to the kind of wire, I employ, on Voltolini's recommendation, exclusively steel wires 0.35–0.5 *mm.* in thickness; they are, in the first place, incomparably cheaper than platinum—a fact of some consequence when operating largely—they have, moreover, the advantage of greater elasticity, which renders it much easier to pass the loop through the nasal funnel in the most diverse directions around the part to be operated upon. Thirdly, they have a bright lustre—a fact of especial importance during operations under rhinoscopy in the upper pharynx. Opposed to all these advantages we have the single disadvantage that the steel wire is burnt through sooner than that of platinum. With practice we learn the knack to prevent even this, when we are enabled to feel that the loop is all around in

contact with the swelling, as the wire will burn through only in the open air.

Regarding galvanometers, I do not consider them of much value for galvano-cautery; it is even impossible to get a correct estimate of the great variety of burners and loops, especially as the latter with progressing diminution must become more strongly heated. My estimation consists in this, that I simply cause the burner to glow shortly previous to the operation,[1] and produce the desired intensity by either greater or lesser immersion of the battery. Where it is an object, especially in operations on very vascular organs, to find the required intensity for the loop, I have invented a very simple little galvanometer consisting of four bits of tubing soldered together. Through their lower ends, which are screwed into the clamps of the handles, a wire is drawn, bearing in front a loop of the size required for the operation. I then find the desired intensity by immersion of the battery, and on employing the same quantity of current with the loop actually used, I am almost certain neither to melt the wire, nor, on the other hand, to cause the patient unnecessary hemorrhage or pain by an inappropriate strength of the current.[2]

For the loops, I employ, like everybody else, plain double tubes.

For the burners I use in some cases the above wheel-handle; namely, when I desire to have a support in my hand and to exert pressure at the same time. Otherwise I take a very small, light handle, which can be easily directed with three fingers—two for holding, one for closing the circuit. With such a one we can operate very nicely and accurately; therefore it is especially suitable to operations in the ear, those through the nasal funnel from in front, and those under rhinoscopy; I now use it almost exclusively.[3] It consists of two strong brass wires set in wood, provided with a lateral key as circuit-closer.

[1] But take care! Fine burners are burnt through in an instant in the open air.

[2] It is not feasible to try the intensity with the loop to be used in the operation, because after a single incandescence the steel wire loses elasticity and brightness—its two valuable qualities.

[3] It is only 4.5 *cm.* long, and weighs 25 *gms.*; Voltolini's bone-handle is x *cm.* long, and weighs 69 *gms.*; Bruns' universal-handle is x *cm.* long, and weighs 91 *gms.*

In the anterior part of the eyelets the burners are to be inserted and screwed tight. I shall discuss the latter under the respective operations.

Now, to return to our naso-pharyngeal affections, we find, besides the previously-discussed disease of the mucosa, often the so-called

Adenoid vegetations.

In the lower and middle pharynx we find them sometimes very numerous, small, like fish-spawn; sometimes plentiful and larger[1]; again they are isolated broad masses, or or isolated and small; occasionally the disease affects, rope-like, the mucous membrane covering the pharyngo-palatal muscles[2]; but never have I seen a complete adenoid degeneration making the entire mucous membrane bulge, as is frequently found in the highest part of the pharynx. All these forms, of course, merge into each other in numerous degrees.

If the vegetations are numerous, it is always best to first cauterize the lower and middle pharynx by from six to nine insufflations of silver nitrate, so as to overcome the general swelling of the mucosa; then to make a pause of one week, and thereafter to destroy the remaining vegetations with the spatula burner bent upon the flat side, using them in various widths and lengths and a thickness of about 0.3 *mm.*[3]

If they are numerous, a small portion should be taken at a time; they should be burnt but superficially and rather repeatedly, the object being to touch the thin mucous membrane only and to avoid scars.

Of great importance are the adenoid vegetations in the upper part of the pharynx, the credit for the first demonstration of which belongs to Wilhelm Meyer.

According to my experience, gained largely by rhinoscopy and digital examination, within the last four years

[1] Both forms are usually denominated pharyngitis granulosa.

[2] Schmidt, of Frankfort-on-the-Main, has made of it a special pharyngitis lateralis.

[3] Many former attempts to remove the granulations with silver nitrate or 90-per-cent. carbolic ac. solution have proved failures in my hands. Cauterizations with zinc chloride may perhaps succeed, but are attended by too many inconveniences, even dangers.

here in Hamburg, where these affections of the pharynx are truly endemic, owing to climatic causes, they may be divided into the following chief categories.

1. Those of the *pharyngeal tonsil*, and

2. Those of the *tissue underlying the mucous membrane.* Where we have to deal with simple hypertrophy of the pharyngeal tonsil, the latter is seen either split in a sagittal direction, like the stalactites of a subterranean cave, but often projecting as far as the upper wall of the soft palate, or curving downward like a parcel, with rather smooth surface. In both forms, the pharyngeal hypertrophy covers almost constantly a lesser adenoid degeneration of the investing mucosa.

3. *General adenoid degeneration of the entire mucosa*, which is seen to be swollen, partly occupying the naso-pharyngeal space, with uneven surface. The tubes are seen less sharply defined than usual.

4. *Proliferation of the same tissue*, but resembling the first form of proliferation of the pharyngeal tonsil, yet to be distinguished by the less smooth surface. In the third and fourth forms, the palpating finger has the sensation as if the pharyngeal space were more or less filled with worms, so rapidly does the slippery surface of the granulations escape from the examining finger.

5. *Combined form of the affections of the pharyngeal tonsil and mucosa.* In this variety the entire pharyngeal space is usually found as if stuffed. The palpating finger has the sensation of the swelled tissue merely.

All these proliferations are best diagnosticated by rhino-pharyngoscopy and digital examination, the former of which, as above said, is of materially greater value.

Their removal requires energetic treatment. Cauterizations, as recommended already by Meyer and later again indorsed by Politzer, appear to me quite insufficient. It is merely necessary to read reported cases, *e.g.*, those of Ganghofer, in which oft-repeated cauterization was required. This is much better accomplished by galvano-cautery. If there are only the slighter forms which encroach only upon a small portion of the pharyngeal space a few strokes of

the galvano-cautery suffice, the operation being performed under rhinoscopy or digital direction by a spatula burner, or from the oral cavity with a bent instrument. The more developed forms, especially the proliferation of the pharyngeal tonsil, require more energetic interference.

Since Meyer has devised his circular knife, he has had numerous successors who proceeded from in front, usually the mouth, with all possible instruments intermediate between scissors, forceps, and hollow chisels, to destroy the vegetations by pinching, tearing, twisting, and crushing. All these procedures bear the stamp of force, cause profuse hemorrhages, certainly are painful, and require numerous sittings.[1]

Inasmuch as the operation of nasal polypi by the forceps, etc.[2] (cold snare), is now generally condemned, and the galvano-cautery recognized as the most correct method, so here, too, the time cannot be far off when the galvano-cautery, as I maintain, will be regarded as the only one justifiable. That this has not heretofore been done is due to the fact that this more laborious method, on account of the battery belonging to it, is thus far almost everywhere in the hands of specialists.

The *galvano-caustic* operation may be performed from *two points*, either the *nares* or the *pharyngeal space.*

Operating in the former manner is done either under rhinoscopy or by digital direction, or, where the nostrils are very wide, under guidance of the eye from in front.

Operations under rhinoscopy require practice on the part of the physician and of the patient. In such cases, I simply introduce the cold burner through the *widest* nostril, and attempt rhinoscopy while the patient depresses his tongue with Türk's instrument, or by employing my modification of Ash's tongue-depressor. A few individuals are so quiet

[1] The main objection I have to them, however, is the uncertainty in the operation, particularly with sharply pinching instruments, among which Löwenberg's forceps stands at the head. To me it is utterly incomprehensible that the tubes are not often quite seriously injured, where a man proceeds at haphazard, guided neither by eye nor the palpating finger, into the pharyngeal space, and grasps whatever he can get hold of.

[2] Regarding the advantages of the various instruments under this head, I refer to Catti.

under it that the inserted burner may be moved in the pharyngeal space without exciting contraction. They are qualified for immediate operation.

The majority cannot bear it. For such patients I prescribe a well-rounded German-silver rod, fifteen centimetres long and three to four millimetres thick, which they introduce several times daily into the wider nostril and move it about in the pharyngeal space, while they at the same time vigorously depress their tongue with a spatula (spoon-handle). If they have practised that well, the operation sometimes can be performed, but usually it does not succeed even then.

In any case, these operations are among the most difficult, as has been already pointed out by Bruns and Voltolini. While performing them I always "labor in the sweat of my brow," and the patient likewise does his best; still we must never forget that just the operations under rhinoscopy are the only ones in which the effectiveness of operating can at all times be exactly watched so as to prevent injury to the patient.[1]

The destruction of the pharyngeal tonsils I effect in these cases by simple spatula or furrow burners (see below), by bending the platinum in such manner as to make the burner sink hook-like into the hypertrophy from behind and destroy it when drawn forward. Or I employ the scythe-burners in the same way. The latter consist of copper wires two millimetres thick, one of which bends above in scythe-form, continues transversely for twelve to fourteen millimetres, according to circumstances, and then, being bent again, runs again in the direction of its first part; but at a distance of two millimètres its course is continued in a platinum wire to which it is soldered, so as to return to the point of origin, where it joins the second returning copper wire. When the instrument is applied behind the proliferation, the platinum wire closely hugs the upper pharyngeal

[1] I have had attached to my illuminating apparatus a contrivance which supports my left operating wrist during this method of operating, whereby, therefore, the light reaches the mirror from below my left arm. In future I hope to facilitate my work still more by the very great conductivity of silver and by a new mode of its attachment, which, however, I shall have to try first.

wall, and when rendered white-hot and drawn toward the nasal septum, it destroys the proliferation.

In certain formations the wire snare may be employed in like way. But it is not always easy to apply the snare in the desired manner, especially as Mitteldorpf's saying, "how clever the snare is," is but seldom verified. If we require manifold movements of the snare-holder, contractions easily ensue which produce an irritability rendering further operation impossible. By employing the burner a material advantage is offered the physician and the patient in my instruments, by the smallness of the handle, facilitating every movement, and therewith lessening the pain.

The operation for proliferations under rhinoscopy with introduction of the instrument from the pharyngeal space has not been successful in my hands. Too many instruments, depressor, mirror, and burner, have to be guided alongside of one another in the relatively narrow space, so that a still greater practice is here necessary to secure good results.

It is different with the operation under digital direction, which is always preferable in children. In them I also introduce the scythe-burner through the nares, then bring it into its correct position by the finger of the other hand introduced through the oral cavity, and make it glow. In using the scythe-burner, the action of which here is excellent, the point of the guiding finger is protected from being burnt by intervening space, so that we have the advantage of controlling the incandescent instrument by the palpating finger.

Another way of removing the vegetations is that with the S-shaped instrument used from the mouth.

For these I employ three burners: 1. The semicircular burner, two copper wires bearing a semicircular platinum wire in front. The patient's tongue is depressed; the instrument, bent off in front, is introduced by crowding it first laterally between the base of the tongue and the arch, by then holding it exactly in the centre, and carrying it far up until the nasal septum is felt, to be recognized by the gliding of the semicircular burner, in being moved to and fro,

across a sharp ridge from one choana into the other; the burner is then lifted up along the septum as far as the upper pharyngeal wall, or rather the proliferations covering it; is brought to incandescence and drawn downward, keeping exactly in the centre. This method is the simplest of all, accomplishes much, and is to be pre-eminently recommended in the fascicular proliferations of the tonsil. I should employ it in all cases, were it not that this method of operating is usually followed by considerable pain and in several cases by contractions of the muscles in the region of the back of the neck. Thus far I do not quite understand why they occur; it could only be through injury to the accessory nerve, which however cannot be reached at all; the only structures which could be touched by deep insertion of the instrument are fibres of the longus cervicalis muscle. A colleague operating with my burner had the misfortune to have the patient undergo right-sided contracture of the muscles for several months, causing no little alarm to the parents; but probably he had proceeded too energetically and had deviated from the middle line. For that reason I employ the procedure only in great hypertrophy of the entire tonsil and avoid penetrating too deeply.

2. An instrument on which I have been at work for years is my thimble-burner. It consists of two very flexible conducting cords composed of well-silvered copper wires which lead to the proper platinum wire attached semicircularly to two thin silver plates. One of the conducting cords runs backward, not directly to the battery, but to a small circuit-closer held in the mouth of the operator, and which effects the incandescence by being bit upon at the appropriate time. The application is very simple: I take the circuit-closer between the teeth, carry the finger armed with the burner into the upper pharynx, as during digital examination, again palpate the vegetations, withdraw the finger behind them, make the instrument glow, and lead it in an easy curve toward the vomer. Although I have operated with it seven times very successfully, I intend to improve it still more, and give it here only a preliminary notice.

3. The employment of the snare from the oral cavity, which I formerly used in various ways, I have been able to dispense with, especially as it is not easy to introduce even moderately large snares into the upper pharynx of children, unless very thick wire is taken. The snare almost always bends, often during vigorous contraction of the muscles around the entrance to the pharynx, even so much as to make it impossible to draw it in. On the other hand, taking, like Michel, very small snares, many sittings become necessary, so that the poor children have to undergo a severe ordeal. I use therefore the snare only in adults, whose pharynx is but little sensitive. I am now at work on a special contrivance for the easy introduction of large snares with which I have not yet operated: I shall publish it in future should it prove practical.

Of the instruments here discussed, the scythe-burners introduced from in front have thus far done me the greatest service. In adults, all these methods cause no material difficulty, but children require much coaxing and many little tricks. I almost always conquer by accustoming the little patient to the introduction of instruments, and then attain my object quickly! Frequently I have the parents insert the above-mentioned German-silver rod several times daily through the nose into the pharynx, which soon makes the children less sensitive, and prepares them for the operation. Coaxing is very effective with these little people; it is easy to gain their affection and confidence, only they must never be told an untruth. I tell every child in advance that the introduction of the finger is very disagreeable, or that the catheter in the nose tickles and presses somewhat, then I coax, but do not desist even if I have to tie them. Afterward I praise them, and therefore they willingly return to me, despite the operations; one little boy, Moltrecht, five or six years old, who had been several times operated upon, even subsequently envied his sister who came under my treatment, and inquired if his turn would not soon come again. Some children positively cannot be conquered by kindness. For these I have constructed an operating-chair which I exhibited at the Baden meet-

ing of naturalists and physicians. It is made of wood, cane, and iron; has a movable seat for the smallest children and for adults, also adjustable to the various inclinations of the body. The head is completely fastened, and also can be set in various inclinations to the body. The seat may be narrowed or widened; hands, arms, chest, thighs, and legs are completely secured by bandages. The chair may be rolled to and fro, be it full or empty. The child is so secured as to make it handy for the operation; usually not even an assistant is required to guide the oral speculum, which is done by the left hand of the operator, as described under digital direction. Many children, feeling powerless in the chair, become tractable and open their mouth readily; others remain stubborn: then we proceed as directed above, in the worst cases Sachs' feather proving effective.

The chair has another advantage: it serves as a warning. For instance, a little three-year-old boy decidedly opposed every attempt at catheterization. After much coaxing I lost patience, bound him tight in the chair, and catheterized him. Thenceforth he permitted the catheterization willingly, but not without first casting a tearful, sidelong glance at the operating chair.

In general, however, the chair is but rarely needed, say in from five to ten per cent. Children readily endure the galvano-cautery; I have even found the subsequent procedures easier than the first, because they have become convinced—which all reasonable persons operated upon have admitted to me—that these operations in the upper pharynx by galvano-cautery are nearly painless; but all concur in this, that the introduction of the finger into the pharynx is the worst part of it, not the burning.

I may add, in a general way, on the subject of operations on vegetations, that in my opinion too much operating is done all around. In the first place, it has frequently occurred to me that children were brought to me with the statement that the proliferation was seen to extend halfway into the choanæ. In such it did not appear credible to me that the symptoms of occlusion could have been produced by the partial obstruction of the nasal passages. Careful

anterior rhinoscopy then showed that the inferior turbinated bones were the cause. In such it is unnecessary to operate on the vegetations without first having made room in the nares. Unfortunately it has become the fashion to examine with the finger every child presenting the suspicious symptoms, and, if there be any vegetations present, to attempt their most thorough extermination. I therefore advise to substitute, wherever possible, rhinoscopy for digital examination, and if that be not feasible, to make at least an exact anterior rhinoscopy, in order eventually to undertake the operation from that point. I shall return to this subject hereafter. Strange to say, the smaller children (not quite excepting the large ones up to twenty-five years) are much opposed to examination with the nasal funnels, thinking that something extraordinary is to be done with them, and they must first be accustomed to them, for which purpose I generally use Cramer's otoscope, with which at the first examination almost nothing can be seen. Of course, small masses of vegetation must often be operated upon if they cause aural symptoms by obstruction of the tubes. What has been stated above refers only to vegetations producing nasal obstruction and its sequelæ.

Smaller vegetations, especially if associated with hypertrophy of the pharyngeal tonsils, diminish decidedly by the use of bracing North-Sea air-baths, among which I enumerate pre-eminently Helgoland, then the islands situated on the Frisian, Belgian, and French coasts. The baths of Sylt, St. Peter, Büsum, and Scheveningen have more inland air, unless western winds prevail. Baltic-Sea air is too mild. Obviously, nothing can be expected except from the prolonged influence of these agents,—four to six weeks is the least. Repeatedly I have observed vegetations to recede by these means, so that I desisted from operating. Supplementary thereto are several daily irrigations of the nose, consisting of one-half to one-per-cent. salt solutions poured simply by means of a teaspoon or a small glass into the nares, while the head is leant back. The more strongly the head is inclined backward, the more transient is the effect of the bath, and the more readily does it reach the

middle and upper nasal passages: it is best to change the inclination of the head.

These nasal irrigations are excellent for softening crusts, etc. In acute coryza, too, I have employed them latterly with good effect when combined with silver-nitrate insufflations, so that this treatment is well deserving of a trial. The most important part of it, of course, is the insufflation with silver nitrate in the above-described manner. The cauterization is performed every other day, the irrigation three times daily, especially in the morning. To entitle me to a decided opinion as to their value I need greater experience; in three or four cases the acute coryza had completely vanished after about three applications.

Also in reference to the operations that are indicated, I am far from the opinion that we should shave clean the entire mucous membrane with its proliferations and the underlying hypertrophies; because Nature certainly has her reason for placing glandular organs in the upper pharynx. I endeavor to restrict myself as much as possible to remove only what is morbid; therefore I never operate in quick succession, but allow at least three weeks to elapse before every new procedure. Rapid operating I hold to be erroneous, if for no other reason than because we are unable within a brief time to separate satisfactorily the consequences of wound reaction from hypertrophy. Moreover, experience teaches me daily that, after partial destruction, these glandular organs atrophy spontaneously. This shows itself most strikingly in the palatal tonsil, which in its structure closely resembles the pharyngeal tonsil.

I think I owe it to this principle of always first to await the result of an operation, that I have repeatedly succeeded in attaining ample success with a single procedure. I have had only one little patient in Hamburg who required six operations.

These results should be appreciated in reference to the strain to which the children are always put, when we read of cases in which among other things twenty-five repetitions are reported (Ganghofer). A quite renowned throat specialist in Germany also told me that his method (application of

small snares) often required six, twelve, and even more sittings.

As to the age of children, I have operated on patients as young as two and a half years. It is better, for obvious reasons, if possible, to await the fifth year, if postponement be permitted by the circumstances, especially by the often complicating ear affection. The older the child, the wider the organs, the easier the operation, the better the result.

In connection herewith I proceed to the

Formations Obstructing the Nose.

In most of these cases we have to deal with hypertrophy of the naso-pharyngeal mucous membrane, affecting with greatest intensity the lower turbinated bones, where it is associated with like disease of the underlying cavernous tissue. The hypertrophy of the middle turbinated bones, although usually slight, produces, nevertheless, grave symptoms, because the nasal cavity here is generally narrower, and complete occlusion of the canal is more rapidly effected; the sense of smell is likewise usually interrupted, for, the turbinated bone pressing against the septum in front, the passage of odoriferous substances by the olfactory epithelium which is there developed is no longer possible.

According to the degree in which the cavernous bodies[1] of the lower turbinated bone participate in the affection the symptoms will vary. In the dorsal decubitus, after ingestion of much nutriment or strong drinks, especially in the evening, the symptoms of occlusion become more pronounced. If the patient (with bilateral intense disease) at night has lain for some time on one side, the occlusion on the same side becomes greater, while the other clears up. The diagnosis is easily made. According to Michel, it is to be recognized by pressure with a strong probe; the normal mucous membrane can be but slightly depressed, in the abnormal the probe often sinks out of sight. Both inferior turbinated bones are so hypertrophic, even in their anterior parts, that on lifting the tip of the nose they may be seen like

[1] Fright and anxiety materially influence the blood supply, as will be seen later on.

two red balls. How often such unfortunate patients have been maltreated by physicians who, mistaking these proliferations of the mucous membrane for polypi, worked with dressing and other forceps, with or without fracturing of the turbinated bones, but always causing the most violent pain and usually profuse hemorrhage. I have repeatedly seen such patients from whom one half of the turbinated bone had been successfully removed. In one case the hemorrhage could be arrested only after twelve hours' exertions. On rhinoscopy the posterior ends are seen as two large, usually whitish bodies occluding almost completely the entrance to the choanæ. The color of the proliferation changes, according as the mucous membrane or the hypertrophic cavernous bodies participate more largely, from dark bluish-red to a much brighter red; while the ends of the lower turbinated bone, rhinoscopically visible through the choanæ, appear pale yellowish-gray, uneven, bearing the greatest resemblance to white raspberries. The cause of this aspect is to be ascribed to the connective-tissue framework, which of course cannot participate in the same degree as the vessels and the loose mucous membrane.

The diagnosis is more difficult when the swellings diminish through the influence of temperature or psychic causes (dread of the examination), which often occurs within a very short time. A timid young girl, who had already assumed the correct position near my illuminating apparatus for the operation of these hypertrophies, exhibited on inspection an almost completely occluded left nostril due to hypertrophy of the turbinated bone. I went to the battery, immersed it, seized the operating instrument so as to introduce it into the naris through the funnel, barely consuming one third minute, when, to my great surprise, the swelling had disappeared and the nostril was free. I at once took in the situation, the girl lay deathly pale in a faint. I utilized the moment, and inserted my furrow burner deep down to the bone into the relaxed cavernous tissue, and drew the white-hot instrument forward through the entire length; at the same time the cavernous body on both sides filled with blood, and the girl had regained consciousness, not through cold water, but by hot fire.

We should be acquainted with such *temporary reductions*, lest we be deceived by them. Since my attention has been directed to them they have not rarely came under my notice. They are mostly caused by anxiety of the patient, and are almost always associated with pallor of the face. After they have been seen a few times, these hypertrophic, cavernous bodies will not be mistaken even in their relaxed condition; we see the posterior two thirds of the lower turbinated bone not, as usually, equally rounded, but sharply defined below, like a gray, loose bag, filling the greater part of the inferior meatus; the cavernous body can be easily depressed deeply and moved to and fro with a strong probe. If the patient is encouragingly addressed, and caused to bend his head forward and downward, the swelling generally soon returns, but not always, probably because the vaso-motor nerves are still influenced by the central nervous system in the same manner as during the falling of the swelling. If still in doubt, repeated rhino-pharyngoscopy soon leads to certainty.

The *causes of the affection* are generally to be sought in the continually recurring and persisting nasal catarrhs. Probably the strongly-developed cavernous bodies are often congenital; but a considerable number of such cases, in which preceding nasal catarrhs were denied, seem to me to indicate that these swellings may be simply due to the continued passage of water-laden air during respiration. For that reason they are so frequent with us in Hamburg, because our air is saturated with water in almost any direction of the wind, from the large water-sheets of the Atlantic, the marshy regions, the Baltic, and the Elbe. This quality of the respired air is not indifferent, as it is well known since the researches of E. H. Weber, that by pure water the epithelia of the mucous membranes swell and even burst. Thus our population breathes day and night largely water-laden air, and is particularly injured by the numerous watery deposits and fogs, often lasting for weeks, so that here is the true Eldorado for chronic naso-pharyngeal affections.[1] If Hamburg

[1] My own formerly quite healthy child of seven years, now, after a residence here of four years, has shown the last year the well-known symptoms, and, unfortunately, examination confirms the proliferation in the upper pharynx.

were situated close to the sea, so that this moist air were salty, we would be better off, as proved by the good results at Helgoland.

In former times I have annoyed my patients with brushings and insufflations of caustic remedies, but without lasting effects. They are useless. The cold snare likewise is not to be used—it meets with too much resistance. Strange to say, the sharp spoon has been recommended, but is to be completely rejected, like all the various pinching and tearing forceps which may perhaps be less objectionable. They all have to yield to the certain, and here easily applicable, galvano-cautery. The only thing which might be tried besides galvano-cautery would be intense cauterizations; but I emphasize that their effect must be watched by the eyes; that is, the cauterization should be done under early anterior rhinoscopy through the nasal funnel so as to hit the right spot.

Here the galvano-cautery is in its proper place. I employ my small, light handle, which I direct with three fingers, and apply the various burners. For marked hypertrophy of the inferior turbinated bone I use my furrow burner (see above). Having immersed the battery so that the intensity of its current suffices for white heat, I introduce it deeply, the concave side of the platinum directed toward the bone, and if permitted by the size of the hypertrophy of the anterior portions I prefer to go as far as the pharynx, but always gliding upon the turbinated bone. By sufficient attention I can feel when the burner glides beyond the posterior end of the cavernous body into the pharynx; if on drawing it forward I feel resistance at that point, its position is correct; I now draw it vigorously into the swelling as far as the forceps part, heat it twice in quick succession, and draw it forward, always aglow, in the same direction in which it was introduced. It is proper here not to bring the burner quite to the anterior end of the lower turbinated bone, because the pain, not very slight at best, materially increases on nearing the front. Of course, the extent of the hypertrophy will decide whether cauterization up to the anterior third suffices. The burner here must not be torn off, but should be

lifted off aglow; otherwise the eschar from the burn will be likewise detached, and we have severe hemorrhage. I then introduce, in place of the furrow burner, the spatula burner of about 4 millimetres breadth and 0.3 millimetre thickness, procure the proper intensity of current, place it as far backward as possible, that is, at the place where the furrow burner began to act, and draw it forward at the upper margin of the wound just made, then introduce it for the third time, and burn the lower margin of the wound. Such a thorough burning has an excellent effect. After from six to ten days a broad, thick, eschar separates, which I usually loosen with the probe at that period, so as to obtain it whole and rid the patient of the obstruction, but lightly and carefully, so as to avoid hemorrhage. I then allow at least three weeks to elapse to await cicatrization and its effects. If the result is still insufficient, I operate again, with furrow or spatula burner, according to indication; usually a single operation suffices. The pain of such operations is generally felt in the teeth of the upper jaw.

We now come to

Nasal Polypi.

No matter whether ordinary mucous polypi as usual, or fibroid polypi, the most correct method of their removal is the galvano-cautery. A suitably formed snare is passed through the nasal funnel by pushing it along the septum, with slight movement, below and behind the polypus; for the purpose of having it glide better, as high as possible along its root up to its point of origin; then the snare is tightened until firm resistance is felt, is brought to incandescence, and completely drawn in. For the removal of polypi the handles of Bruns and Schech are better adapted than mine, as no considerable hemorrhage is here to be anticipated.

The large polypi, generally springing from the middle turbinated bone, are easily operated upon. If we have to deal with numerous small ones, which are met with especially in cases formerly operated upon, and the snare cannot grasp a whole bundle at once, we take only those larger than a pea,

then use a white-hot spatula burner, simply lay it on and press it deeply down to the point of origin, and thus destroy the whole of the small proliferations until nothing of any consequence remains. It is advisable always to keep ready three or four tubes armed with wire. If the field of operation is not clean, water is syringed through the other nostril so as to make it remove the ragged tissue and blood clots from behind; inversely they might be forced into the tubes, and there produce otitis media—an accident which unfortunately occurred to me. After one nostril has been freed from polypi, the patient usually has enough, even if the other side is affected in the same way, which latter is taken in hand after the lapse of eight or ten days. Parts of still remaining polypi are not again attacked before three weeks. In the case of large polypi, which reach down into the pharyngeal space, we often fail in grasping them from in front alone by simple introduction of the snare, but we are obliged to go into the mouth with the finger of the other hand, and place the snare around it.

A young man came to me with an enormous polypus filling the greater part of the pharyngeal space. Several physicians had already worked at it with snare and forceps, but in vain. To me the operation appeared very simple; but lo! even I could not get the snare around it through the nasal funnel. The very submissive patient bore the introduction of the finger for only a moment; gagging and nausea at once ensued: in short I could not grasp it. A happy thought struck me: I saw the root of the polypus spring from the middle turbinated bone, took my scythe-burner, inserted it straight through the nasal funnel, the bent end turned downward, pushed it under the root, then directed the bent end upward, so that the root of the polypus lay in front of the platinum wire, tightened it, made it glow, severed the root with the burner without causing pain or hemorrhage, and the patient the next moment spat out the immense polypus into the handkerchief, and was delighted to be rid of the troublesome symptom.

Should a similar case occur again I shall employ the scythe-burner from the start.

After completing the polypus operation we should direct attention to the fact that even if all the polypi seem to be destroyed their point of origin requires some supervision during the next months. Wherever a suspicious spot is found it is removed with the scythe-burner. If after the lapse of about a year nothing suspicious recurs we may feel secure. Unfortunately but few patients are reasonable enough to follow this advice. They are glad to be rid of the annoying symptoms, and do not return until they recur, which of course takes years.

In those cases in which, after removal of the hypertrophied mucous membrane or polypi, some nasal occlusion remains behind by reason of the narrowness of the bony structure, we have reached the end of our therapeutics; the results obtained by Ruprecht with his compression-forceps do not stimulate us to imitation. Voltolini recommends the burning away of the strong projections of the septum, and in small deflections of that nature I have followed his advice with success. I have abstained from the burning away of large projections, because I should have produced a perforation, in the beneficial effects of which I have less faith than some authorities.

In many cases hypertrophy of the cavernous bodies covers the turbinated bone so greatly and completely, that we are obliged to operate first on the anterior parts, and then turn to the posterior ends, which of course requires double or perhaps more procedures.

Although the hemorrhage is very slight, I always let the patient wait a while after the operation, and meantime tampon the nose from in front; let him sit bent forward and receive any blood in an empty glass vessel, so that I can estimate its amount. Then I let the patient wear for two days purified sheep's wool formed into a ball (as above described) at the entrance to the side operated upon, to keep off draughts and dust. The patients wear it willingly, especially as it does not occlude absolutely as cotton does.

If besides hypertrophies of the inferior turbinated bone the nostrils are narrow, it may easily happen that despite every precaution the septum is injured (radiant heat), and that on

cicatrization both organs become opposed, and after removal of the eschar the two opposite wound surfaces adhere to one another. In such cases I introduce three times weekly a tortoise-shell plate ten centimetres long, one centimetre broad, and one centimetre thick, until the wound swelling, and with it its danger, is past.

Formerly I operated with the snare, which offers the advantage, that we obtain the spherical ends of the turbinated bone with one effort, until I had the misfortune twice to remain impacted with the snare: once it tore, and I escaped with a pretty severe hemorrhage; the other time it stuck immovably, and could neither be torn nor burnt. With much effort I finally got it out by pushing it backward. On examining several specimens I easily found the cause. At the point where the mucous membrane of the pharynx merges into that of the nose it is very thin, and is firmly attached to the bone. If the snare comes to be applied to this spot it gets to the bone at once, and burns itself into it. From that time on I ceased to operate on these formations with the snare, and used the furrow burner. Latterly I have also employed the scythe-burner with advantage, and in great hypertrophy of the posterior turbinated bone I think it more rapid than the furrow burner; but I desire to gather more experience on this point before I shall recommend it unqualifiedly. The application is simple. It is introduced straight, and when in the pharynx it is turned laterally; the turbinated bone is thus seized, the burner heated and drawn forward.

Ozæna.

As to ozæna, I believe it to be the direct consequence of chronic purulent inflammation of the nasal mucosa, from whatever cause produced. Numerous histories gave their origin in continuous coryza, which, especially in narrow passages, finally leads to almost permanent chronic inflammations of the mucosa, the purulent deposit of which remained unheeded for months, even years, in spite of all stench. Certainly, in many of these cases, bad nourishment, scrofulosis, tuberculosis, and syphilis may have contributed, but I

do not incline to look upon them as the fundamental causes. Just here in Hamburg there is a great deal of ozæna, and I even observed it frequently in otherwise well-nourished individuals in whom the above causes must be excluded. I do not here touch upon the well-known treatment; it is elsewhere described in detail.

The prognosis is bad, for what is buried will not be resuscitated. The destroyed organs cannot be re-created. We must limit ourselves to combat the troublesome symptoms and to prevent the progress of the disease. Almost all the resources of therapeutics have been exhausted for this disagreeable affection. The first is thorough cleansing of the naso-pharyngeal space of the offensive, inspissated masses of pus, in the manner fully given above under the description of my syringe, frequently combined with supplementary nasal douchings, to be carried out in the beginning three times daily.

I emphasize particularly that I make the success depend on such thorough cleansing of the naso-pharyngeal space. Gottstein published two excellent papers on the treatment of ozæna by means of tampons; I have also seen good effects from it, only my patients will not get used to the wearing of the tampons, even alternately and for but a few hours a day. My treatment now is the following: I first inspect whether there are any proliferating portions of the mucous membrane, such as are easily found in ozæna, especially at the middle turbinated bones—conditions to be designated as precursors of atrophy. These I cauterize superficially. The rest of the mucous membrane I treat a few times with cauterizations of silver-nitrate powder in the above-described manner, and thereby obtain within a short time an essentially clean appearance of the diseased parts. I then employ gypsum-tar (℞. Calcii sulphatis, 100.0; Picis liquidæ, 25.0. S. Pulvis subtliss.).[1] The patient receives four[2] of the above-described glass tubes and a piece of rub-

[1] The attention of the druggist should be called to the fact that the powder must be produced very fine and uniform, that it may easily be blown through the tube.

[2] Any mechanic, glazier, etc., will undertake the manufacture of these tubes for the patient for a slight remuneration.

ber tubing. He takes up as much as the bent part of the tube will hold, and with his mouth blows the powder in several doses into his nostrils. At first this insufflation is required twice daily; the powder with the purulent scabs forms dry brittle masses which are removed by the next syringing. The offensive odor soon diminishes, only a slight smell of tar of course remains perceptible, which is one hundred times more sufferable than the vile smell of stinking pus, or of thymol which is used by preference on the tampons by some physicians.

With this treatment I have attained excellent results, among them three quite desperate cases; that is to say, I have brought them to the point that the patients continued well with perhaps three syringings per week or at most one per day, without gypsum-tar or other remedies. I think it indicated, after discharge of the patients, to make them wear purified sheep's wool in each nostril, as described at the beginning of this paper. This acts as a protection against sudden chilling of the anterior nares, from which the cavernous bodies, which warm the respired air, have often completely disappeared, as also against dust and other impurities which irritate the mucous membrane.

Also for the *operation on*

The hypertrophic palatal tonsils,

under certain circumstances, the *galano-cautery is especially indicated*, even indispensable.

Ordinarily I operate with Matthieu's tonsillotome, of which I have four different sizes, and with good results. I do not share Hedinger's view, who desires to see galvano-cautery employed only as a safeguard against hemorrhage; he cites four (?) fatal results. Among a very large number of cases operated with Matthieu's instrument I have witnessed only once a serious hemorrhage, where against my will the greatly hypertrophied tonsil slipped through the ring and was completely extirpated. Ordinarily I only take a part. Dieffenbach's operating "on the fly" I have not hitherto seen by any surgeon, it was always more of a hacking off. If the patient keeps very quiet and depresses the

tongue well, it is of course no masterpiece to remove it with one sweep; otherwise, especially with children, it is decidedly difficult. Neither am I in favor of directing the section from above downward, but rather from below upward; it once happened to me that one tonsil, well separated with the knife except the lower sharp bridge, slipped from my hook toward the larynx, so that it cost me much trouble to remove it with the scissors. The majority of cases of fatal hemorrhage have been operated upon with the knife, with which, of course, we are much more liable to injure the carotid by a false lateral sweep than with Matthieu's tonsillotome, which protects the surroundings. That we should be able to reach the carotid with it at all, I believe to be impossible from an anatomical point of view.[1] An accident may be due to a very abnormal formation, but for that no operator could be made responsible (see Luschka, "Schlundkopf," etc.).

Only in small or anæmic people, and where the tonsils are excessively developed and betray already by their external appearance great vascularity, I operate, with reference not to an arterial, but profuse venous hemorrhage, by means of the galvano-caustic snare, which, as a rule, cuts very smoothly; and during the employment of my wheel handle I have had only minimal hemorrhage. A rather coarse wire should be chosen for it, otherwise it will be difficult to place, as during every gagging motion the tonsil is slightly withdrawn and the snare is easily slipped off. In a case of that kind, in which the first tonsil was removed quickly and almost bloodlessly, the snare on operating on the other tonsil was stripped off four times by the now greatly irritated pharynx, until finally the fifth attempt succeeded by the finger of the other hand holding the snare behind the tonsil until it was drawn in—a procedure which I commend any way for cases in which much gagging occurs.

[1] The hemorrhage could also come from the ascending pharyngeal artery or the dilated veins in or beneath the tonsil. Compare "The Question of Hemorrhage after Tonsillotomy," by G. M. Lefferts, M.D., New York (*Arch. of Laryng.*, 1882, No. 1), and the discussion following the reading of this paper before the third annual meeting of the American Laryngological Society.—Moos.

Certain but slower is the diminution by the insertion of burners, for which I prefer my furrow burner. I draw into the tonsil two deep longitudinal furrows from above down, and follow it up with the spatula burner. Hemorrhages such as are feared by Hedinger during white heat of the burner I did not observe at any time, although I have performed the operation frequently. This method is best adapted for cases in which the capsule of the tonsil is adherent to the arch; it may then be drawn forward and small slices be removed from Matthieu's tonsillotome or the knife, while the burner can be easily used without any forward traction.

I can recommend this method of diminution, especially for the latter cases; usually the burning must be repeated several times, but here also it is necessary to wait two or three weeks with the next sitting, because a great deal disappears by atrophy.

I do not think it right to attack both sides in one sitting, as usually a pretty strong reaction occurs, often with dysphagia lasting for days; the latter can be much improved by syringing with ice-water combined with cold compresses on the corresponding external parts of the neck.

Finally I come to the *application of*

Galvano-cautery in the Ear.

For the removal of polypi, formerly Wilde's snare was generally employed; later, that of Blake. Both have the disadvantage that we have no proper fixed point in the thumb ring so that we cannot avoid a lever-like motion, which makes its greatest excursion at the long arm, the snare end, even when using an instrument well suited to the size of the thumb. Thereby the snare is easily displaced and unnecessary pain caused to the patient. In order to avoid this, I took Tobold's handle, which is constructed for laryngeal polypi, and placed upon it a plain silver tube, with its distal ends pressed flat,[1] into which the fine wire snare is inserted. Below, the handle is completely fixed and the

[1] Compare different text-books.

finger is free to operate. With this snare I have operated on all soft aural polypi for about five years past.[1]

For fibroid polypi I have had constructed a snare-holder the tubes of which, including insulation, measure but 2.8 *mm.* These are armed with fine platinum wire of 0.3 *mm.*, the snare is properly adjusted, and the operation is performed quickly and with very little pain by the galvano-cautery.[2]

For the removal of small polypoid proliferations I also use small burners bearing in front a plate ranging in diameter from 3 to 1.5 *mm.* For the cauterization of the smallest proliferations situated in perforations I use a platinum wire ending in a point. The afore-mentioned flat burners serve at the same time for making artificial perforations, with which I have not thus far, to be sure, secured any particular results as regards the remaining open. In but a single case I succeeded in keeping the perforation open (under observation nine months) after making the opening twice at the same spot and inserting a tubule of aluminium (Voltolini), whereby violent tinnitus has entirely disappeared and the hearing has been quite materially improved. Similarly as for this purpose, the employment of these burners and the traction handle commends itself also for those who precede the division of tensor tympani by a perforation[3] and for the removal of exudations in chronic and subacute cases,[4] because the procedure can be done more rapidly, bloodlessly, and with less pain than with other perforating instruments; and because exudations, especially if tenacious, can be removed more easily, both by aspirating instruments[5] and in other ways, through a round opening made of any size desired, than through a fissure, the size, direction, and patency of which cannot be produced with an equal certainty by the knife.

[1] Gruber's handle, the description of which has been published but two years ago, is likewise very good for the purpose, only I believe—without being able to assert it positively—that my Tobold's wire snare can be directed with greater steadiness.

[2] To twist or tear off such polypi is unnecessary cruelty, and is even not quite free from danger.

[3] Hartmann justly recommended this, because the snare is more easily drawn into such tubes.

[4] I should not advise it for acute cases, because there I fear the radiant heat.

[5] Aspirators of Gruber, Schalle, Hartmann.

TWO CASES OF TINNITUS AURIUM CAUSED BY DISTURBANCES IN THE CURRENT OF CERVICAL BLOOD-VESSELS.

By R. C. BRANDEIS, of New York.

Case 1.—*Tin. aurium; spondylitis cervicalis. Both cured by application of jury-mast.*

Jas. T., aged 9 years, had long been troubled by persistent beating, pulsating noises in the left ear. This symptom was so strongly marked that the parents of the boy were rendered quite unhappy by his repeated and urgent appeals for relief.

The patient's appearance was wan and worn, his eyes heavy and dull, skin dry, tongue furred. He was unusually tall for his years, but at the same time very slight and delicately built. His mother informed me that some six months before his visit the boy had been thrown from his pony while riding and had fallen on his back, his head having struck heavily on the ground. There was no wound or discernible injury, but for some days later the patient had complained of pain in the nape of the neck, and intense headache in the occipital region. These symptoms were relieved by rest in bed and ice bags, which were regularly applied to the affected parts. Four days after the fall the boy was quite well again and returned to his school duties, but a week later he came home complaining of intense headache, which he referred to the upper cervical and sub-occipital region, and of a most distressing noise in the left temple. This latter symptom has persisted almost uninterruptedly, to the time of his visit. His sleep was restless and disturbed, appetite poor, and the movements of the bowels irregular. On examining his ears I found no sign of disease, the membranæ tympanorum being normal in color and contour. Hearing, as tested by watch and

voice, was normal in both ears. Auscultation of the heart and the great vessels failed to give any signs of aneurysmal dilatation or other disease.

Some time previous to this I had a case of pulsating noises in the ear, due to aneurysmal dilatation of one of the arteries of the head, and I was therefore careful to search for a similar cause in this case. But the most careful examination resulted negatively. I was therefore unable to arrive at a positive diagnosis, and could not do otherwise than give an unfavorable prognosis. As the parents of the patient insisted that I should institute a course of treatment, I ordered a blister of cantharidal collodion to the cervical region, and the internal administration of twenty drops of hydrobromic acid (dilute) three to four times a day, my assumption being, that the tinnitus was due to labyrinthine congestion, probably caused by a dilatation of the left vertebral artery, suggested by the pains in the back of the neck.

The patient was told to apply the blister weekly for a month, to take his medicine regularly, and then report to me again.

Within a week marked cervical spondylitis involving the 2d, 3d, and 4th cervical vertebræ set in, which, besides presenting all the characteristic symptoms of the disease, was complicated by intense hemicrania and intolerable tinnitus aurium on the left side. The orthopædic surgeon applied a corset and jury-mast with chin support, and as soon as the head was lifted from the trunk, all head and ear symptoms disappeared spontaneously. The child wore the support for three weeks or more with marked relief; one night, however, the apparatus was removed, as he complained of pain in the back, and an hour later the tinnitus and headache returned with almost their original intensity. This condition lasted during the night, neither patient nor parents dreaming that there was any connection between these and the spinal caries. When, however, the brace was readjusted next morning all distress vanished. The child was now brought to me again, and after many interrogations I succeeded in eliciting the above-stated facts. Since that time, nearly three months ago, the boy has worn his support uninterruptedly, and none of the symptoms under consideration have ever manifested themselves. I learn from the attending surgeon that the spondylitis is rapidly disappearing and that the patient will be able to dispense with his brace within a month or two.

In a series of papers published in the London *Lancet*, 1878, and afterward collected in book form, entitled "Deaf

ness, Giddiness, and Noises in the Head," Dr. Edward Woakes calls attention to the fact that the arterial supply of the perceptive portion of the auditory apparatus, or, in other words, of the labyrinth, is derived from the vertebral artery; the immediate supply coming from the arteria auditiva interna (Hyrtl).

If this artery is in any way interfered with, so as to change the free flow of blood to the labyrinth, it can readily be seen that the vascular supply of the internal ear must also be affected. Any lesion which tends to impair the natural tonus imparted to the vertebral artery by the vaso-motor nerves, which are derived from the inferior cervical ganglion of the sympathetic system, may cause a dilatation of its calibre and, *pari passu*, a congestion of the labyrinth. The increased quantity of blood now contained in the internal ear will press upon the intralabyrinthine fluid, and thus give rise to palpable noises. These are always synchronous with the diastole of the heart, and may be heard with great distinctness.

This condition of the vertebral artery can only be attributed to the shock and subsequent inflammation of the cervical vertebræ, particularly of their left half, caused by the injury which the patient received when he fell from his pony. The vertebral artery, after leaving the subclavian, passes upward and backward, and enters the foramen at the base of either the sixth or some higher cervical vertebra. It now passes vertically through the foramina in the transverse processes of the upper vertebræ until it reaches the axis; it then passes backward over the atlas, and, entering the cranial cavity through the foramen magnum, goes to make up the basilar artery.

The inflammation of the intervertebral discs and the probable affection of the transverse processes of the diseased vertebræ probably caused a paresis of the vaso-motor nerves controlling the vertebral artery, and the check having been removed, allowed an overwhelming quantity of blood to flow into the labyrinth.

The fact that the noise disappeared as soon as, and as long as, the supporting apparatus was applied and the dis-

eased surfaces were separated, and only returned when they were allowed to come in contact again, seems to me pretty conclusive that the explanation which I have given is the correct one.

CASE 2.—*Tinnitus aurium and headache; fibrous goitre; cure by injections of tincture of iodine into goitre and internal administration of fluoric acid.*

Mrs. McF., aged 54 years, had long been afflicted with constant rushing noises in the right ear and corresponding side of the head. These noises, when they first began, some four years ago, had troubled her only occasionally; but within the last eighteen months had increased steadily, so that, when she first consulted me, in December, 1881, the patient was almost distracted by the unceasing din in her ear.

Mrs. McF. is a large florid woman of apoplectic appearance, and was born in the county of Derbyshire, England. For several years past she has been affected with sexual troubles, owing to the gradual appearance of the menopause. I learned that she had been under the treatment of a succession of reputable physicians, who, in their endeavors to relieve the headaches and tinnitus aurium, had at one time or another treated her uterus, ovaries, heart, and liver, but without affording any decided relief. Careful examination of the ear failed to elicit any cause for the trouble, but casual inspection showed a decided dilatation of the veins of the left side of the neck, and of the temporal and posterior auricular region. When she coughed or attempted to blow her nose, I saw that the frontal and facial veins became unusually distended and varicose. I had not far to seek for a possible cause for this condition of things, for on baring her neck I discovered a large fibrous goitre, involving the right lobe of the thyroid gland.

This had existed for more than forty years, and was common to the larger number of the patient's family—who for many generations back had lived in a part of England where goitres are almost as commonly seen as in Switzerland or the Tyrol. Within the last three or four years, however, the tumor, which had formerly been quite soft, had hardened and diminished to its present size. On measuring the circumference of the neck carefully I found that, from the inferior thyroid incision around the neck to the spinous process of the sixth vertebra measured $11\frac{3}{8}$ inches on the right side, and only $9\frac{3}{4}$ inches on the left. That is, the enlargement due to the goitre was now $1\frac{5}{8}$ inches.

Thinking that the cause of the noises in the ear might be attributed to venous congestion, due to the pressure exerted by the hard tumor from below upon the anterior vessels of the neck, I proposed to treat the goitre by means of injections of tincture of iodine, as first proposed by Dr. Lücke, of Strasburg. Three hypodermic injections, made at intervals of one week, failed to have any effect. At this time I administered 10-drop doses of a one half ($\frac{1}{2}\%$) per cent. solution of fluoric acid, and continued my injections weekly. A month later the circumference of the neck had been reduced to $20\frac{1}{2}$ inches from $21\frac{1}{8}$ inches, and at the same time the tinnitus had lessened considerably, and the headache had only manifested itself occasionally. I continued the hypodermic injections and the exhibition of fluoric acid, but after three months desisted from all further treatment. At that time the neck was 20 inches in diameter, and the tinnitus had almost entirely disappeared. There had been no headache for more than six weeks. The condition of the patient was most satisfactory, her appetite excellent, sleep undisturbed, and all the emunctories in proper order. In order to prevent any return of the goitre I advised the occasional inunction of the ointment of the red oxide of mercury.

The veins of the labyrinth, *i. e.*, the vena aquæductus cochleæ and the vena aquæductus vestibuli, both pass into the jugular vein, the former directly, the latter in part, inasmuch as it may pass into either the inferior petrosal sinus or into a vein of the dura mater. Any disturbance to the uninterrupted efflux of the venous blood may therefore be the immediate cause of a venous congestion of the labyrinth, and thus give rise to the rushing noises, which vary in intensity with the degree of obstruction.

In this case, however, the retardation was not limited to the ear, but as the obstructive agent pressed upon the jugular vein itself, the congestive symptoms extended to a great part of the region which is supplied by the ramifications of this vein. The headache, which was so prominent a symptom, was undoubtedly due to the congestion of the veins of the forehead, temple, and posterior auricular region, as well as the lateral and cavernous sinuses, all of which go to make up the vena jugularis.

Although parenchymatous injections of the tincture of iodine or other alcoholic solutions afford very satisfactory results in diminishing the bulk of goitrous tumors, I hardly think that I would have succeeded so rapidly in causing the tumor to disappear had I not also administered the solution of fluoric acid at the same time. This remedy was first employed by Dr. Edward Woakes, who acted upon the statement made by Prof. Virchow, that in those regions in which goitres prevail an absence of the fluorides can always be detected in the water drunk.

OTITIS MEDIA CATARRHALIS: OBJECTIVE SOUNDS (SPASMODIC CONTRACTION OF TUBAL MUSCLES?); NERVOUS ORIGIN; HYSTERIA.

By RICHARD C. BRANDEIS, M.D., of New York.

On February 1, 1881, Dr. R. O. Born, to whom I am also obliged for many of the details incorporated in this report, sent me Bianca B., aged 27 years, who was suffering from continuous, distressing noises in the left ear. For several years past the patient had been afflicted with daily recurrences of malarial fever which had greatly impaired her general health. I found marked hypertrophic pharyngeal catarrh of more than eight years' standing, which, of late, had rapidly grown worse, owing to repeated exacerbations. This trouble extended upward into the naso-pharynx, and examination, by means of the rhinoscope, showed that there was considerable thickening of the pharyngeal openings of both Eustachian tubes, and also some sluggishness of the tubal muscles. For about a week previous to examination there had been a considerable impairment of hearing in the left ear. Both mem. tymp. were sunken, left malleus considerably injected, and a large area in the posterior half of the drum-head depressed, which was probably a healed perforation. While making Valsalva's experiment the posterior fold bulged very much, but collapsed as soon as the inflation ceased; this was also the case when pneumatic traction was made.

For four or five days the patient had noticed an almost continued crackling sound, which was very like, but more intense than the noise made by rubbing the hair near the ear. She noticed four or five or more of these noises in rapid succession, then an interval of perhaps two or three seconds and a repetition of the crackling. This continued almost uninterruptedly, day and night;

an occasional cessation of a minute or two being the only respite the patient enjoyed. She has always been able to inflate her ear without closing nose or mouth, and whenever she did so she noticed a crackling before "the air passed out through her ear," as she expressed it. This had up to the last four years always relieved any temporary impairment of hearing, but since that time she has not been able to force air into her right ear. The result was that her hearing was greatly diminished on that side, but the changes in the weather had no apparent influence. Valsalva was successfully and easily done on the left side until a few days ago. Since then, however, considerable force must be applied in order to inflate that ear. There is a sensation of great fulness on that side, and H is greatly reduced. H left and right $=\frac{15}{30}$. *R* ear, whispering V 15′. *L* ear, loud V $\frac{20}{60}$.

I was able to hear the crackling noises complained of at a distance of about 20 feet from the patient, and if the sounds did not follow each other too rapidly I was able to count them.

A careful inspection, through the speculum, with the aid of a magnifying lens, of the *Mt*, its normal reflex, the handle of the malleus, and the reflex from the depressed portion, did not show any vibrations or movements whatever. The slightest touch of the walls of the auditory meatus with the speculum, or any other instrument, gave rise to a very distressing ear-cough, which, at times, endured for half an hour or more. This much I learned at the first and only examination of the patient. The following notes are copied from Dr. Born's case-book:

"*Feb. 3d.* Within the last two days the ticking has ceased, occasionally, for several hours at a time, during the forenoon. In the afternoon, it has always been more persistent than in the early part of the day. At present, I can only hear the crackling occasionally, and then not more than $\frac{1}{2}$–1 foot from the patient.

"*Feb. 7th.* After taking 20 grs. of quinine, the patient imagined she could hear better. Has now taken 40 grs.; tinnitus—V, *L E*, $\frac{15}{60}$′, h. $\frac{15}{30}$″; ticking less frequent and not so loud as before; patient is very irritable toward evening; hysterical. There is slight anæsthesia of the lower part of the left auricle, and also on the left side of the head when combing the hair.

"*Feb. 9th.* For several hours after the air-douche had been used, the air passed into the left ear, but the sound of the voice was not affected. There is less crackling, but hearing is diminished. V, *L E*, $\frac{8}{60}$, ; V, *R E*, $\frac{15}{60}$; h $\frac{1}{\infty}$ in either ear. There is now no im-

provement after Politzer; the tubes are open; very marked tinnitus; noises like the rattling of cars; the numbness is the same as at the last visit.

Feb. 24th. Patient has had bellows noises for several days past; these are rhythmical; autophony. Her face is flushed; there is a small perforation in the upper part of the left *Mt*; perforation whistle but no discharge.

March 18th. Clear mucous discharge; slight in quantity. Ordered a solution of zinci sulpho-carbol. for ear.

March 26th. No discharge; can inflate left ear by Valsalva's exp.; color of *Mtt* normal; h $\frac{8}{36}$ on both sides; V, *L E*, $\frac{15}{20}$ (whisper); V, *R E*, $\frac{15}{60}$.

At that time the crackling noises were still very marked, but owing to the disappearance of the patient no further history of the case can be given.

I think that the clinical history of this case proves pretty conclusively that the objective aural sounds were not due to contractions of any of the intrinsic muscles of the affected ear. The most careful inspection of the *Mt* failed to show the slightest movements, and the use of the air-douche, Eustachian catheter, and pneumatic speculum did not produce the least effect in changing either the intensity or frequency of the noises.

Although I did not succeed in detecting any movements of the tubal muscles, or any alteration of the normal function of the soft palate, aside from a slight impairment of mobility, I cannot account for the noises in any other manner than by attributing them to clonic spasms of the levator palati muscle. This is the more probable, as I discovered considerable congestion of the pharyngeal opening of the left tube. The nervous element of the case must also be considered; for the patient was markedly hysterical, and it is quite possible that the muscular spasm may have been due to this cause. Analogous instances are not wanting—we need look no farther than to the nervous spasms of the orbicular muscles of the eye to find, that in a hysterical patient constant, involuntary contractions of muscles may recur indefinitely without apparent cause.

REPORT OF THE PROGRESS OF OTOLOGY DURING THE SECOND HALF OF THE YEAR 1881.

Translated by Drs. W. C. AYRES and R. C. BRANDEIS, of New York.

I.—COMPARATIVE ANATOMY.

By H. STEINBRÜGGE, of HEIDELBERG.

(Translated by WILLIAM C. AYRES, M.D., New York.)

1. Prof. KUHN, Strassburg. Contribution to the anatomy of the ear. Part iii. The membranous labyrinth of reptiles. Bonn, 1882. *Archiv. f. microscp. Anat.*

2. URBAN PRITCHARD. The cochlea of the ornithorhynchus platypus compared with that of the ordinary mammals and of birds. (From the philosophical Transactions of the Royal Society, part ii, 1881.)

3. J. IBSEN, Prof. i Anat. (Died., 1862). Anatomiske Undersœgelser over Œrets Labyrinth. Afsluttet af Forfatteren i 1846. Nu redgivet paa Carlsbergsfondets Bekostning ved Dr. P. L. Panum, Prof. i Physiologi, Kjœbenhavn, 1881.

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1. In his article on the labyrinth of reptiles, KUHN gives 7 plates and 73 figures. He describes minutely the inner ear of the chelonia. He describes also the ears of ophidia, sauria, and crocodiles, and shows that they differ but little from the tortoises.

He starts by giving the bones of the labyrinth of the chelonia as follows: the os proöticum and opisthoticum inclose the space for the labyrinth, as in the batrachia. It is limited anteriorly by the foramen trigemini; posteriorly, by the foramen jugulare, forming an irregular pyramid whose base is upward and whose apex is downward. The larger upper half contains the vestibule, semicircular canals, and ampullæ; the smaller lower half, the saccu-

lus, the pars basilaris (the analogue of the cochlea), and the lagena. On the lateral side of the pyramid we find the oval foramen containing the foot-plate of the columella; on the posterior, the foramen rotundum, whose occluding membrane is wanting; on the median wall, the entrance for the ram. vestibuli and cochlearis. Above this is the apertura aquæduct. vestibuli, and the aqueduct enters between the round and oval windows. A delicate periosteum lines the space for the cochlea and the semi-circular canals, showing an epithelial covering with pigment cells, like in the corresponding tissue of the batrachia. The membranous labyrinth in the pars inferior is covered by a well-developed covering, composed of connective tissue with a few spindle-shaped cells. This is connected to the periosteum on the one side, and to the membranous labyrinth on the other, by bands of connective tissue. A section shows round or oval spaces which contain the perilymph. The space between the lateral wall and the membranous labyrinth is larger than that on the median side. It therefore happens that the membranous labyrinth is eccentric, and nearer the median wall. It stands upright within its bony case. The utriculus is a cylindrical tube running from in front backward; its longest diameter is one *cm.* From its middle a tube goes upward (sinus utriculi), into the non-ampullary end of which the frontal and sagittal semicircular canals open. The sagittal and horizontal ampullæ connect with the anterior part of the utricular tube, while the posterior end of the latter goes over into the frontal ampulla. The non-ampullary branch of the horizontal semicircular canal opens into the posterior surface of the sinus tube, just over its origin from the corp. utriculi. The anterior end further contains a round vesicular organ, the recessus utriculi with the macula acustica, the floor of which is composed of spindle-cartilage, and the thin walls of the utriculus itself are made of connective and elastic tissues. The space for the utriculus connects directly with the sacculus by an elliptical opening (foramen utriculo-sacculare). Ampullæ and semicircular canals are composed of spindle-cartilage. In the tortoise the cristæ acusticæ are biscuit-shaped. The inner surface of the utriculus and its adnexa is covered with a layer of pavement epithelium; in the neighborhood of the nerve epithelium this is transformed into cylindrical cells. In this way the plana semilunata stand on both sides of the crista. Since the crista is not on the bottom of the horizontal ampulla but on its wall, we find only one planum

semilunatum. We find tall, transparent cylindrical cells, as the so-called roof-cells of the raphe ; they form a light stripe, which is continued on to the inner wall of the semicircular canal. The sacculus, which lies below the utriculus and above and in front of the pars basilaris, is a large, flat double organ whose lateral and medial halves only touch each other below, the utriculus projecting between them from above. The medial portion (cartilage in its inferior part) can be called its floor, the lateral (membranous) its roof. The former passes backward into the anterior part of cartilage of the pars basilaris, and contains the opening of the ductus endolymphaticus (aquæd. vestibuli) in its superior half ; in its inferior, the recessus sacculi, which contains the macula.

The lateral half, composed of connective tissue with a basilar membrane and a pavement epithelium, contains an opening into the cochlea, whose cylindrical cavity, the scala cochlearis, is perpendicular, and limited by membranous walls (memb. basilaris and Reissneri). The cartilaginous side exhibits an oval space whose anterior half is concave, the concavity being an analogue of the sulcus spiralis of mammals. There is a lateral and a medial projection, to the former of which the membrane of Reissner, to the latter the basilar membrane, is attached. The former projection is similar to the triangular cartilage of birds, or to the ligamentum spirale of mammals. The anterior half is also termed nerve cartilage, since the n. cochlearis enters through it. The space which is exterior to Reissner's membrane may be called scala vestibuli, that interior to the basilar membrane the scala tympani. Reissner's membrane can be considered a continuation of the membranous (lateral) sacculus-shell, and has a tall cylindrical epithelium on its inner surface. The memb. basilaris is finely striated, and shows round cells with large nuclei on its outer side ; has a basilar membrane with the macula acustica basilaris on its anterior third, and a cylindrical epithelium on its posterior division. The cavity of the pars basilaris is continuous anteriorly into the lagena, the latter being likewise a continuation of cartilaginous enclosure. On its inner surface it is covered with a fine reticular network, and has an epithelium which is continuous with that of Reissner's membrane. In the beginning the cells are low, but toward the neuro-epithelium of the crista lagenæ they are taller.

Before its entrance into the bone the acoustic nerve divides

into the ram. vestibuli and ram. cochlearis. The former supplies the macula in the recessus utriculi, and also the cristæ of the sagittal and horizontal ampullæ. The latter sends a branch to the macula sacculi, the pars basilaris, the lagena, and crista of the frontal ampulla. A fine branch goes to the nerve papilla on the inner surface of the utriculus, in the vicinity of the mouth of the frontal ampulla (described by Retzius[1] as ramulus neglectus in reptiles).

The nature of the nerve epithelium and the terminal nerve fibres is made much clearer, for the finer histological structure of the macula of the sacculi, the cristæ of the ampullæ, the crista acoustica of the pars basilaris, the lagena, and papilla Retzii is everywhere the same, and very similar to the analogous parts in the ears of the teleosts and the amphibia. On the basilar side of the cartilage, we find a single row of small round cells, without a cell-membrane, the so-called basilar cells, between which is a granular amorphous mass. Then comes the layer of cylindrical cells, whose lower parts show with osmic acid a nucleus and nucleolus. The inferior ends of these cells are sometimes conical, often sharp-pointed, and occasionally thread-like. A reticular edge forms the upper margin which is passed only by the acoustic hair-cell formations, the size and physiological significance of which have not yet been precisely determined. At any rate they have nothing to do with the nerve terminations. The nerves lose their medullary sheaths after having penetrated the basilar border. The axis-cylinders then pass to the inferior ends of the cylindrical cells, without entering them ; or by crossing each other they form a plexus, from which the terminal fibres start, and pass between the cylindrical cells up to the free surface of the nerve epithelium. On the cristæ of the ampullæ we find the finely striated enigmatical structure of the cupula terminalis shaped like an admiral's hat. On the nerve epithelium of the utriculus, the sacculus, and the lagena are otoliths of soft chalk surrounded by membranes. Kuhn was not able to find otoliths in the pars basilaris, but its nerve epithelium is covered by the membrana Corti. The crista acustica lagenæ lies on the medial surface of the wall of the lagena, in the shape of a half moon.

[1] Retzius first found this papilla in the fishes and called it papilla basilaris. Kuhn shows further that the pars initialis cochleæ in reptiles is a further development of this papilla. Since both of these authors found this nerve in the higher reptiles in the utriculus, and not in the cochlea, although it belongs to the ram. cochlearis, it cannot be a part of the cochlea. Kuhn therefore proposes to drop the terms "papilla basilaris," and "ramus neglectus," and proposes the term "papilla Retzii" for the ending of this nerve.

Then follow examinations of the labyrinth of the tropidonotus natrix from the genus ophidia. We will restrict ourselves to the principal points in the labyrinth of the tortoise. The connective tissue is wanting in the vicinity of the membranous labyrinth, the perilymph being inclosed in a free space. As in the batrachia the lagena is larger than the pars basilaris. Reissner's membrane, which is a continuation of the roof of the sacculus, does not insert itself into the anterior cartilage of the pars basilaris, but passes over it. The cristæ of the sagittal and frontal ampullæ (not the horizontal) have a short transverse ridge in the middle of the longitudinal ridge, by which a crucial figure is formed called septum cruciatum. The crista lagenæ is very long, and shaped like a horse-shoe. Among the saurians the author examined the lacerta muralis and l. agilis: in them also the connective tissue in the perilymphatic space is wanting. The sinus utriculi is longer, the sacculus larger than in the ophidia. The lagena is much larger than the pars basilaris. The oval space of the latter and also the membrana basilaris are divided into two halves by a strip of cartilage running through their middles. The n. partis basilaris is therefore divided into two branches. The double-contoured nerve fibres enter the nerve epithelium with their medullary sheath, and connect with the under end of the cylindrical cells. No plexus (same as by the teleosts).

Then follows a description of the inner ear of the alligator lucius from genus hydrosauria. There is an outer, middle, and innner ear (transition stage to the birds). The bony case of the cochlea is bent backward; also in the interior there is a spiral bending whose convexity is turned frontward. There is a depression on the medial surface of the pyramid for the meat. aud. int. The scala vestibuli and scala tymp. communicate at the apex of the cochlea, where the membranous lagena does not completely fill the bone cavity.

There is no connective tissue in the perilymphatic space. The labyrinth is generally more voluminous; its tissue is tough and more cartilaginous. The sacculus passes over the canalis reuniens at its posterior inferior end, which unites with Reissner's membrane and leads into the scala cochleæ. On account of the spiral twisting the nerve cartilage is behind, and the triangle (corresponding to the spiral ligament) in front. The lagena is composed entirely of cartilage. The papilla Retzii is pushed into the vicinity of the frontal ampulla.

2. The cochlea of the ornithorhynchus platypus is of special interest, since it belongs to a class which forms the link between birds and mammals. PRITCHARD's examination shows the peculiar condition, that in its grosser structure the cochlea approaches that of birds, whereas in its finer structure it is similar to the mammals. The axis of the short cochlear tube is still vertical, in contradistinction to the horizontal cochlea of mammals, and terminates in the lagena; it has a lateral dilatation and bends outward. It differs in this respect from the cochlea of birds, which bends inward. Scala vestibuli and scala tympani communicate by a helicotrema, and are lined with an epithelium on the inner side. The former is much the larger in size. The ductus cochlearis extends into the lagena and ends in a blind sac after having made a convolution of 270°. Its superior end ought to communicate with the sacculus, but the author was unable to demonstrate a connection. As to its histological structure, it is almost identical with that of mammals. The rods of Corti are very steep; instead of one vas spirale, it has two; and also Reissner's membrane is rich in vessels which form well-marked glomeruli. There is no great difference in the inner and outer hair-cells and in the nerves, from those of mammals. The walls of the lagena are composed of thick connective tissue and are covered with a cuboid epithelium on the inner side. At the end of the duct. cochlearis, the same nerve epithelium shows itself as in the macula sacculi (basilar layer, small round cells, above which hair- and bristle-cells, covered by a cuticular membrane). The whole is covered by a mucoid mass, which in the fresh condition probably contains the otoliths. Bundles of the acoustic nerve enter here and end in the epithelium. The author hardened the labyrinth in chromic acid and decalcified it with a $\frac{3}{4}\%$ solution of hydrochloric acid.

3. Concerning IBSEN's publications, Prof. Moos received the following note from Victor Bremer: "This book has had a remarkable fate. It was written 35 years ago, and appeared some 20 years after the death of the author. It was presented to the Scientific Society of Copenhagen in 1846, with the idea of having it placed in the archives of the society. The society acknowledged its reception, but wished a rearrangement for publication; on account of which the illustrious anatomist, Ibsen, was offended, and did not wish it published at all. It comprises very fine comparative anatomical examinations of the cochlea, especially of fishes and

reptiles, and is still of material value, especially to anatomists. The Carlsberg-Fond in Copenhagen has had it beautifully printed, under the direction of Prof. Panum, presenting it as a memorial of its illustrious author."

The reviewer can only corroborate these statements, viz. : that the book is of great value to those who are interested in comparative anatomy of the cochlea, notwithstanding the fact that since we know the finer histological structure from Corti, and have made such progress in microscopical technique that examinations of the cochlea which were made so long ago would not suffice to-day. So much the more praiseworthy is his work, since he had made some of the most difficult examinations without our technical devices, and prepared specimens which Eschricht still describes as the "gems" of the Copenhagen museum. The reproduction of these in the book are very fine, and as far as the grosser anatomy, semicircular canals, and sacculus are concerned, answer all purposes. It is, however, more difficult to reconcile Ibsen's method of classifying the cochlea of the vertebrates into three groups to our more extended knowledge on this subject. In fact we can almost believe that it was this classification which made the committee wish a revision of the original. In the membranous labyrinth, the author distinguishes besides the semicircular canals, the alveus, and the utriculus, a large and a small stone sac (saccus and sacculus lapilli), so called on account of their containing the otoliths. He distinguishes three principal groups by the relative position of these sacs : In the first group the small sac lies beneath the larger, and communicates with it by an opening, or with it forms one organ. This group comprises specimens from the petromyzons up to the birds inclusive. In the birds the smaller sac corresponds to the lagena. In the second group, the small sac lies behind the larger and communicates with it at first ; later they separate, and the former lies under the alveus, which position it also has in the third group, where it corresponds to the vestibular sac, or what we now call the sacculus. The larger sac develops itself from a simple vesicle to an oval sac, which is divided by a membrane containing nerves. In the second group the perennibranchiata (for instance the siredon Mexicanus) are the lowest type, the teleosts the highest. The monotremes (echidna hystrix and ornithorhynchus) form an intermediate group. The third group comprises the mammalia, in which the larger sac is transformed into the coch-

lea. The lamina spiralis (accessoria) of the cochlea is considered analogous to the otolith contained in the large sac, and is named concholith, since Ibsen found it of chalky hardness and containing numerous otoliths. As to the details of the extensive examinations (commencing with specimens of only one semicircular canal with two ampullæ, and containing examples from all varieties of vertebrates) we must refer to the original; the reviewer would call attention to a few points which testify to Ibsen's peculiar and independent mode of investigation. He first demonstrated that the membranous semicircular canals are not situated in the central axis of the bony canals, and are not surrounded by the perilymph, but that they are attached to the concave edge of the bony canals. The aqueduct of the cochlea served for the entrance of a blood-vessel. In the whale and seal it also contains a twig of the n. vagus. The aquæductus vestibuli commenced in the large sac or the cochlea, and in the embryo of man has a high development, but is atrophied later; it corresponds in the plagiostomes to a duct which starts in the stone sac and leads to the outer surface of the head. In nine deaf-mutes, besides anomalies in the cochlea, Ibsen found the aquæductus vestibuli unusually large, and considered the condition a fault in development. Besides he described a funnel-shaped prolongation of the utriculus, which in fœtal life perforates the bone at the posterior edge of the oval window, forming a communication between the utriculus and the drum-cavity. He found this continuation in mammals, also in 4-9 month human embryos, and reports a few cases in which he observed the outer opening in the drum-cavity, and that he passed a human hair through it. The reviewer found in an adult a strongly developed ligament at the position described by Ibsen, which attached the utriculus to the outer wall of the vestibule. Finally, we will remark that the "alveus" of many of Ibsen's drawings of the labyrinth of animals corresponds to what is now called the "sinus utriculi"; and that part which he describes as utriculus, is now called the recessus utriculi.

II.—PATHOLOGY AND THERAPEUTICS.

By A. HARTMANN, of Berlin.

Translated by William C. Ayres, of New York.

GENERAL.

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4. ROSSI, Prof. E. de. X. Anno di Insegnamento della Otojatria, etc. Rome, 1881.

5. J. GOTTSTEIN and R. KAYSER, Breslau. The diminution of hearing in locksmiths and blacksmiths. *Bresl. ärztl. Zeitschr.*, No. 18, 1881.

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15. H. STEINBRÜGGE, Heidelberg. A case of diplacusis. These ARCHIVES, vol. xi, No. 1, page 15.

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18. MAURICE RAYNAUD. De l' otite diabétique. *Ann. des Mal. de l' Or.*, 1881, p. 63.

19. CHARLES E. HACKLEY, New York. Inhalations of chloroform as a cause of ear-disease. These ARCHIVES, vol. x, p. 202.

20. M. OUSPENSKY, Moskow. Surdité compliquée, etc. *Ann. des Mal. de l' Oreille*, 1881, p. 373.

21. Prof. ZAUFAL. The importance of examining the fundus of the eye in the diagnosis, prognosis, and treatment of ear-diseases. *Prag. med. Wochenschr.*, No. 45, 1881.

22. YOUNG. On the bad effect of alum gargles on the teeth. These ARCHIVES, vol. x, p. 115.

23. GELLÉ, Société de Biologie. The accommodation of the ear. *Le Progrès Médical*, No. 43, 1881.

24. SCHWABACH. The methods of testing the hearing. *Eulenberg's Real-Encyclopädie*, vol. vi, p. 567.

25. SCHWABACH. Ear-trumpets. *Ibidem*, p. 574.

26. BAROTOUX, Paris. L' audiphone de Rhodes, etc. *Ann. des Mal. de l' Or.*, 1881, p. 95

27. EDUARD FOURNIÉ. Nouvelles recherches sur le fonctionnement de la tube d' Eustache, etc. *Revue Méd.*, No. 38, 1881.

28. F. M. WILSON, Bridgeport. Three aural conveniences. These ARCHIVES, vol. x, p. 204.

29. J. P. WORREL, Terre-Haute. A new device for holding the otoscope and laryngoscope. *Am. Journ. of Ot.*, vol. iii, p. 280.

30. G. CZARDA. New instrument for the treatment of diseases of the nose, larynx, and ear. *Prag. Illustr. Vierteljahrsschr. der ärzl. Polytechnik.*, 1881.

31. CHR. SCHMELCK. Nogle Bemerkinger om Oeret og dets Plege, etc. Christiania, 1881.

32. ARTHUR HARTMANN, Berlin. Deaf-mutism and the education of deaf-mutes by lip-reading and articulation. With numerous and important additions written by him expressly for this work, etc. Translated by J. Patterson Cassels. London, 1881.

33. Compte rendu du congrès internat. pour l' amélioration du sort des sourds-muets, tenu à Milan du 6–11 Sept., 1880. Rom., 1881.

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1. BEZOLD's report covers a space of three years, 1878–80. During this time 1,759 ear-patients were treated. He divides his patients according to their age. Adults, 1,407; children up to puberty, 352. Simple catarrh of the tube was very frequent in the children, while only 7 per cent. of this class suffered from chronic middle-ear catarrh. He also makes a distinction between one-sided and bilateral affections. The chronic non-suppurative

diseases occur in the majority of cases on both sides, while all acute diseases were in the majority on one side. According to B. furuncles only occur in the cartilaginous portion of the external canal. A diffuse idiopathic inflammation of the external canal with secretion of pus from the surface, has no right of existence in the pathology of the ear. All ear-operations, even puncture of the drum-membrane, B. does under antiseptic precautions. The canal is syringed with a 2-per-cent. solution of carbolic acid, and the instruments washed with a 5-per-cent. solution of the same, and afterward the canal is filled with boracic acid. Bezold agrees with Löwenberg that in treating acute diseases of the middle ear with boracic acid, an artificial enlargement of the perforation of the drum-membrane is often necessary. Small polypoid growths form in some cases. A secondary otitis externa is never observed.

2. HABERMANN gives a report of Zaufal's clinic for 1880. There were 1,149 patients, 698 men, and 451 women. Of these 254 came only once. Of those treated 476 were cured; 213 improved; 61 not cured; result unknown in 94; died, 3; transferred to other departments, 15; and 33 still remained under treatment. The report includes a table of cases, table of operations, and the histories of many cases.

3. WEIL examined 4,500 school children, boys and girls from 7–14 years old. His preliminary communication shows: 1, that the normal ear must hear the whisper at 20–25 metres; 2, defects of hearing are very common; in the schools 30 per cent. of the children heard badly with one or both ears; 3, the children of well-situated families gave better results than those whose situation was bad, in one private school, for instance, there were only 10 per cent. who heard badly; 4, the percentage of bad ears increases with the age; 5, the country schools gave a relatively good result. (See the author's elaborate paper in the previous number of these ARCHIVES. K.)

4. As in past years, ROSSI gives a complete report of the cases which have come under his treatment. There were 526 in all, 293 men, 139 women, and 94 children. Twenty-seven cases were received in the hospital clinic. Rossi discards Wilde's incision in acute affections of the mastoid process, since, according to his experience, such effects subside under warm irrigations of carbolic acid, and the use of blue ointment and the extract of belladonna. He uses warm cataplasms very frequently. We must refer to the

original for the histories of many interesting cases of caries of the mastoid process with the formation of sequestra.

5. GOTTSTEIN and KAYSER report the results of an examination on the influence that the business of locksmiths and blacksmiths have on their ears. A comparison is also made between these and other workmen whose ears are not affected by their occupation. The results are tabulated, and are as follows: lock- and blacksmiths incur a gradually increasing diminution of hearing from their business. It is caused by the accompanying noises, and is most probably the result of an affection of the acoustic nerve from over-irritation by sound and concussion.

6. This brochure contains about the same as has already been published in these ARCHIVES.

7. JACOBY held the position of surgeon to a railroad for 10½ years, and examined eighty engine-drivers, twenty of whom he had had under treatment. Five of these had one-side affections of the labyrinth, and in the others acute or chronic anomalies of the middle ear. In two who had served a long time, there was no diminution of hearing. He further mentions the opinion of many railway surgeons, that only a few persons working on locomotives need be discharged from service. He adds that, according to his observations, a diminution of hearing need not occur, contrary to the extensive and laborious examinations of Schwabach, Pollnow, and Hedinger.

9. KIRCHNER reports the results of his investigations made in the Pharmacological Institute at Würzburg, on the effects of quinine and salicylic acid on the ears of different animals. Larger animals were given 1–3 *grm.* by a stomach-pump, and afterward fed for several days. *Post-mortem* examination showed hyperæmia and hemorrhages in the tympanic cavity; also in the labyrinth, numerous hyperæmic conditions and reddish coloring of the endo- and perilymph. In a second publication he tries to bring the results of his experiments in accord with clinical observations. The case was that of a pathological change in the ear after quinine or salicylic acid, probably a vaso-motor disturbance, in which there was not only a temporary hyperæmia but a paralysis of the blood-vessels, with stasis and exudation in the various tissues of the ear. Antiphlogistic remedies were used, such as blood-letting, mercurial ointment, iodine; in chronic swelling, a solution of salt and sal ammoniæ, iodide of potash, or nitrate of silver. In troublesome tinnitus with diminished bone-conduction good results were obtained from the constant current of electricity.

10. TUCZEK reports an interesting case of a patient who was admitted to the clinic in Würzburg on account of melancholia which had occurred simultaneously with noises in the head and ears. She said that she constantly heard something like the ticking of a watch, and attributed her sadness to this noise. When close to the ear of the patient a crepitant noise could be heard at 20 *cm.* It occurred rythmically precisely twice as frequent as the beat of the pulse. When the mouth was open it could be heard at 12 *cm.* The carotid pulse was felt with every second undulation over the vena jugularis externa, and in the maxillary region. Hearing was perfect on both sides, drum-membranes normal; no effect after galvanization. It was accidentally discovered that the noise ceased when the speculum was pressed against the posterior wall of the external canal. The canal was accordingly tamponed, yet the noise continued, but ceased after the tampon was removed. With the cessation of the noise, her melancholia also passed off, after a short time. In trying to explain the case Tuczek suggests that the synchronism of the noise with the venous undulation is important.

11. HERZOG reports minutely the case of a 76 year-old woman who had very loud hammering noises in her ear. On the same side (left) a spot as large as a ten-cent piece appeared on the mastoid process, which was soft and red. Pulsation could be felt, and a blowing noise could be heard in it with the stethoscope which was isochronic both with the heart-beat and the noise of which the patient complained. A swelling also occurred later in the carotid. Besides these there were palpitations of the heart, dyspnœa, congestion, and temporary convulsions in the left extremities, and hyperæsthesia in the corresponding side of the head, which Herzog described as reflex symptoms. The noise disappeared completely on compression of the aneurismal spot on the mastoid and the carotid, and the hearing was at the same time improved. H. considers the hammering noise as a bone-conduction of the blood-sound in the aneurism of the post. auric. artery.

12. WEIL comes back to his old observation, that noises in the ears can be influenced by blowing air against the wall of the ear. Since he has already declared this result as an effect of reflex irritation of the vaso-motor nerves, he now writes: "All noises that can be stopped by inflations are blood-noises." He seeks to prove the correctness of this by citing many examples. Local irritations of the canal, as, for instance, touching it with a

cold probe, can not affect the acoustic nerve. That the sympathetic is really excited he infers from his observation of the dilation of the pupil after the inflation. Many diseased processes are then referred to in which the cessation of the noises follows, or does not follow.

13. LADREIT DE LACHARRIÈRE distinguishes three kinds of noises: 1. Those which come from closure of the outer-canal or the Eustachian tube. 2. From compression of the middle ear, caused by pressure on the hammer in swelling of the mucous membrane. In all cases the pressure is transmitted to the labyrinth by the stirrup. 3. Labyrinth noises caused by labyrinthine affections.

16. GLAUERT reports a case of double hearing caused by an acute exudative middle-ear inflammation. The patient heard two sounds in the diseased ear, one of which seemed to be an echo in the ear of the original sound. Testing with the piano, all tones from "D" up were heard double. It disappeared when the disease was cured. G. thinks that the position of double hearing was in the labyrinth.

17. COOPER tries to show that there is a very obstinate form of chronic otitis with diminution of hearing, which is caused by slow or abnormal cutting of the wisdom teeth. He gives five cases, and one of them at least seems to prove the correctness of his opinion.

18. RAYNAUD is convinced that otitis diabetica happens more frequently than is believed, and that this otitis, like anthrax, diffuse phlegmon, or genital-erythema, can be considered as the result of the diabetes. He bases his opinion on the observation of one case. In a person with pronounced diabetes and dropsy, sudden pain occurred in the ear, and during the night there was profuse hemorrhage; later there was a bloody serous running which contained no sugar. There was a small perforation of the drum-membrane. *Post-mortem* examination showed middle-ear inflammation, with ostitis of the mastoid cells. R. thinks that the latter is very important, and says that nothing can be more natural than to connect the otitis with the diabetes.

20. OUSPENSKY reports two cases of hysterical deafness. One was a young lady of 19, who had lost both drum-membranes from scarlet fever, and was completely deaf. Besides the deafness there were loss of smell and taste, paralysis of the palate and one side of the face, also defective vision, and anæsthesia on one half of the

head. The hearing came back, but disappeared again suddenly. On account of the nervous character of the deafness O. galvanized the sympathetic in the neck. The deafness disappeared suddenly, and after six applications did not return. In the second case the patient had been deaf on one side, and had had troublesome noises for five years. The auricle and external canal were insensible. She lost her hearing suddenly, after sneezing. In this case also, all the symptoms disappeared after galvanizing the sympathetic in the neck.

21. ZAUFAL gives the results of his experiments under the following heads:

1. Ophthalmoscopic examinations are an integral part in the examination of the ear, in diseases of the drum-cavity, both in the acute and chronic otitis med. suppurativa in whatever stage they come under treatment.

2. In cases where the examination of the sound-conducting apparatus gives a negative result, in difficulty of hearing or deafness, subjective noises, vertigo, etc. (also after traumata), the ophthalmoscopic condition is of great importance in the diagnosis of labyrinth or intercranial affections, or a combination of both. (Knapp's suggestion of the necesity of an ophthalmoscopic examination in cases of so-called nervous deafness.)

3. In determining the indications of trepanation of the mast. process, an ophthalmoscopic examination is invaluable. It can show us an extension of the inflammation of the drum-cavity into the brain (meningitis, thrombosis of the sinus, etc.) at a time when the subjective symptoms are not yet pronounced. When the meningeal symptoms are increasing we notice also an increase of the ocular symptoms, and when they diminish the ocular symptoms diminish likewise, (Albutt, Kipp, Zaufal).

4. The influence which trepanation has on the brain process is most easily observed in the changes in the optic nerve and retina.

5. Changes in the background of the eye generally occur, in the passing over of an inflammation of the drum-cavity to the brain, first in the eye on the same side as the ear-disease. Generally both eyes are affected, and it may happen that the opposite eye is the more so.

6. After the trepanation the improvement in the eye is more marked, first on the side of the affected ear. The eye on the other side is also preceptibly improved.

In all of Zaufal's cases where otitis med. supp. led to meningitis

or sinus thrombosis there were well-marked changes in the background of the eyes. In order to show the value of an ophthalmoscopic examination, he gives the history of a case very minutely.

23. The instrument which GELLÉ uses to measure the accommodation of the ear consists in a soft tube which is put into the ear air-tight, the other end being attached to an india-rubber bag. If a tuning-fork is struck and placed on the tube, and the rubber bag compressed, the degree in which the tone of the tuning-fork is heard in different amounts of pressure of the bag lets us form a conclusion as to this function of the ear. Whether Gellé has used the instrument practically or not is not mentioned in his report.

24. SCHWABACH treats of the examination of the ear, in a short but exhaustive manner, *Eulenberg's Real-Encyclopädie.*

25. The same author has written an article on ear-trumpets in the same work. The useful instruments for this purpose are there described.

26. In the deaf-mute institute in Paris some new experiments were made with the audiphone in the presence of Rhodes, its discoverer. They showed that no improvement was obtained with it in the perception of speech. Musical sounds seemed to have been more confused by it.

27. In his earlier experiments FOURNIÉ came to the conclusion that the Eustachian tube was open in the state of muscular rest. The manner of proving this is somewhat peculiar. He took two glass balls, which were attached by a glass rod 2 *mm.* thick. In one of the balls there is gas; the other is closed. Since he could not smell that gas was in the first ball he considered it as proven that by open tubes no air went into the drum-cavity. It must therefore be driven into it by the action of the muscles. Later anatomical considerations have convinced him that the tubes are widest opened at the beginning of the act of deglutition, brought about by the action of the tensor veli and the m. glosso-palatinus. In the latter part of this act the tubes are compressed by the tensor tubæ, and the air contained in them forced into the drum-cavities.

How erroneous the conclusions are which Fournié draws from his alleged physiological facts, is evidenced by his discussion of the usual methods of inflation. According to Fournié Toynbee's experiment does not produce a rarefaction but a condensation of air in the drum-cavity. A simple inspection of the drum-head

during this experiment would have convinced him of the contrary. In Politzer's experiment the forcing of air into the tubes is of but little moment. In Lucæ's or Gruber's procedure the passage of air through the tubes, according to Fournié, is impossible, as the tubes are closed. The best procedure is now found: "The procedure of Edward Fournié." Open the mouth before a looking-glass, depress and contract the velum palati, until above and before the anterior arches two small dimples are formed; in that moment the tubes are opened and the air enters the drum-cavity by itself.

29. WORREL recommends to fasten the forehead mirror by a semicircular steel spring, passing antero-posteriorly over the head.

30. CZARDA'S new instruments are: A long parallel mirror for the pharyngo-nasal cavity; a modified hard-rubber atomizer with interruption valve; a new fountain syringe for ear and nose; a slop-bowl for ear and nose; a set of rhino-surgical instruments.

31. A popular little book for ear-patients.

32. In the English translation of HARTMANN'S treatise on deaf-mutism the statistics of Wilhelmi (see these ARCHIVES, vol. x.) are added.

(The remaining part of this report is translated by Dr. R. C. BRANDEIS.)

EXTERNAL EAR.

34. W. H. ROBB. A case of microtia. *Amer. Jour. of Otol.*, vol. iii, page 228.

35. H. KNAPP. Bilateral rudimentary auricle, with absence of the external auditory canal. These ARCHIVES, vol. x, page 119.

36. CLARENCE J. BLAKE. Treatment of othæmatoma. *Am. Jour. of Otol.*, vol. iii, page 193.

37. H. KNAPP. The nitrate of silver treatment of eczema of the ear. These ARCHIVES, vol. ix, page 346.

38. M. BUCH, Helsingfors. Fibromata due to the wearing of ear-rings. *St. Petersburg Med. Weekly*, No. 31, 1881.

39. ED. ELY. An operation for prominence of the auricles. These ARCHIVES, vol. x, page 97.

40. E. MÉNIÈRE. The mastoid region, considered in its relation to disease of the external meatus, without any affection of the middle ear. *Gazette des Hôpitaux*, No. 86, 1881.

41. AUGUST LUCAE. On the importance and operative removal of exostoses of the external meatus. *Arch. f. Ohrenheilk.*, vol. xvii, page 266.

42. F. GRAF, Frankfort on-the-Main. On the nature of desquamative inflammation of the external meatus. *Mon. f. Ohrenheilk.*, No. 12, 1881.

43. E. ZAUFAL. Report on the foreign bodies observed in the meatus and tympanic cavity at the Aural Clinic at Prague. *Prag. Med. Wochenschr.*, No. 35, 1881.

44. MOLDENHAUER. Removal of a foreign body from the auditory meatus, with partial detachment of the auricle. *Arch. f. Ohrenh.*, vol. xviii, page 59.

45. THOMAS BARR, Glasgow. Foreign bodies in the ear. *Glasgow Med. Journ.*, No. 6, 1881.

46. E. D. SPEIR. A new and simple proceeding for the removal of foreign bodies from the ear. *Amer. Jour. of Otol.*, vol. iii, page 197.

47. F. BEZOLD, Munich. Scald of the membrana tympani. *Arch. für Ohrenh.*, vol. xviii, page 49.

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34. ROBB reports a case in which there was malformation of both auricles. On neither side was there a trace of any depression which might correspond to the auditory canal. The whispering voice was heard at 6 feet distance, and ordinary conversation as far as 15 feet.

36. In two of the cases of othæmatoma described by BLAKE, the exudation was located on the left side ; no psychical disturbances were discoverable. In these cases the fluid was evacuated through an incision made into the tumor, and continuous pressure was applied by means of small sponges and an elastic bandage. Massage was not employed before the exudation had disappeared. In both cases a perfect cure was attained. Blake advises caution in the use of massage ; it should only be resorted to when pressure has succeeded in restoring the ear to its normal shape.

38. In BUCH'S case, a woman of 19 years, two tumors, varying in size from a hazel-nut to a pea, and due to the irritation caused by the wearing of ear-rings, were found on the lobules of both ears. They had formed in the course of a year. The tumors occupied the entire substance of the lobule and were confluent. Microscopic examination determined that they were of a fibromatous nature.

40. Of nine cases of affections of the mastoid process due to inflammation of the external meatus, MÉNIÈRE reports three in detail. In every instance in which this complication arose, the original seat of the disease was located in the posterior and upper

part of the canal, where the fibro-cartilaginous portion is joined to the bony portion. The treatment employed is antiphlogistic ; if this does not suffice, Wilde's incision must be made. (Ménière's experiences supplement those previously made by *Hagen.* REVIEWER.)

41. In the first of LUCAE'S cases of exostosis of the auditory canal, a sponge tent had been forced into the passage, a piece of which had become detached and was left behind the isthmus. Otitis media acuta purulenta, extending to the mastoid process, causing caries, set in. The sponge tent was removed with forceps, and the mastoid perforated by means of a probe. All the alarming symptoms now disappeared. In three cases Lucae removed the exostosis by means of chisel and hammer. In all of these the exostosis extended further into the meatus than was first supposed. Lucae recommends the use of the chisel and hammer because the operation can be so easily performed with them.

42. In one of GRAF'S patients a severe inflammation of the auditory canal appeared, necessitating incision of the protruding lining membrane and of an abscess behind the auricle. There was an evacuation of pus and debris from the meatus. Granulations were found in the canal, and there was also a perforation of the membrane. Recovery, with a moderate amount of hearing, set in after the removal of the epidermal plug.

43. In the introduction to his report ZAUFAL explains how malingering soldiers sometimes produce otorrhœas by using irritant applications. In one case the soldier made use of two pellets of cantharidal plaster enveloped with fine thread, the two pellets being joined by a string.

In a total of 4,960 cases, 109 foreign bodies were found in 100 persons ; 92 were readily removed by means of the syringe, but in the rest, which had become firmly impacted, owing to previous futile attempts at extraction, other instruments were employed. Even these, though mostly seeds of various kinds, could have been readily removed, had the syringe been used before they had become swollen. If the foreign body has passed into the tympanic cavity, through the membrane, and cannot be removed by the forceps, Zaufal does not hesitate to excise a part or the whole of the membrane.

Among the foreign bodies there were 30 which could swell up ; 19 of these were removed by the syringe, 3 by means of instruments without the use of anæsthetics, and 7 under anæsthesia. A bean was removed by means of the galvano-cautery as proposed by

Voltolini ; in the remaining cases the foreign body was extracted by means of hooks and curettes, and in another instance by means of the air douche. There was one case in which a bean having been forced into the depths of the meatus, in consequence of previous attempts at extraction, where chloroform was administered and the foreign body destroyed by the galvano-cautery ; cerebral symptoms set in, terminating four days later in death.

Zaufal does not favor the proposal to treat such foreign bodies as cannot be removed without force on the expectant plan, especially not those which have entered the tympanic cavity ; they should be extracted before dangerous symptoms can make their appearance.

In order to prevent any foreign bodies from swelling, oil should be used instead of water in syringing. Swollen bodies can be made to shrivel by instilling glycerine ; they will shrink even more if alcohol and ether be used.

44. MOLDENHAUER, by partially detaching the auricle, removed a gravel which had been forced far into the auditory canal in fruitless attempts at extraction. A semilunar incision, extending from in front of the auricle to the base of the mastoid process, was made ; the auricle was gradually dissected away and the meatus opened as near as possible to the drum-head. The attempt to extract from above by means of small blunt levers failed. The incision was therefore extended to the apex of the mastoid process. The operator now succeeded in moving the foreign body by applying leverage from below, and then withdrew it from the canal with a forceps. After applying a few sutures the wound healed by primary union. Only after four months did the discharge of pus cease, and the perforation of the membrane heal.

Moldenhauer concludes, from his operations on the cadaver, that it is best to enter the canal from behind and below. "An incision close to the insertion of the auricle will divide the soft parts to the periosteum ; between the periosteum and the cellular tissue we can push forward, detach the cartilaginous portion by means of the scalpel handle, so as to be able to divide the auricle as near as possible to its attachment. In order to loosen the foreign bodies he recommends small, blunt, obtuse-angled levers, which are bent in different directions and whose inner surface is plane and roughened.

45. BARR enters into a general consideration of foreign bodies and the methods of removal. He dwells with emphasis upon the

fact, that it is first of all necessary to make sure that there is a foreign body, and alludes to a case, reported by Pilcher, in which, in their efforts to remove the *corpus delicti*, the surgeons of a London hospital extracted the malleus, whereupon the patient died two days later. At *post-mortem* no traces of a foreign body could be found. For purposes of extraction, the syringe, a blunt hook devised by Lister, and Guye's forceps respectively are recommended.

46. SPEIR says that if a foreign body is lodged in the cartilaginous portion of the canal, it can be removed, or, at any rate, brought near the meatus, if a finger is firmly placed before the tragus, and is then passed upward and around the canal to the auricle and back again. The finger is then taken away and the manœuvre repeated until the body is dislodged.

47. BEZOLD has seen two cases of scalding of the membrana tympani with boiling fluids. Although the inflammatory changes in the canal were not of importance, there was extensive destruction of the membrane with consecutive otorrhœa. The thinner portions of the drum-head were entirely gone, and only the limbus, handle of the malleus, and the uppermost portion of the membrane behind it remained intact. Bezold considers a yellow scab, situated on the apex of the handle of the malleus, and which is probably the necrosed and cicatrized medial zone of the membrane, as pathognomonic of scalds. In one of the cases there was entire regeneration of the drum-head, which was, however, followed by perforation ; in the second case an oval defect remained. The author also reviews the literature of the subject.

MIDDLE EAR.

48. ST. JOHN ROOSA. On the value of operations in which the membrana tympani is incised. These ARCHIVES, vol. x, p. 181.

49. ALBERT BING, Vienna. The diagnostic and therapeutic value of inflation of air into the middle ear. *Allegem. Wien. med. Zeitschr.*, Nos. 30 and 31, 1881.

50. SEXTON. Anomalies of the membrana tympani, etc. *Am. Journ. of Otol.*, vol. iii, p. 273.

51. LADREIT DE LACHARRIÈRE. On swelling and anchylosis of the joints of the ossicula auditus. *Ann. des Mal. de l'Oreille*, p. 133.

52. H. KNAPP. The cotton pellet as an artificial drum-head. These ARCHIVES, vol. x, p. 60.

53. S. CORE, Quincy, Ill. Application of cotton pellet in destruction of membrana tympani. *Ibid.*, vol. x, p. 117.

54. B. LÖWENBERG, Paris. Investigations regarding the occurrence and importance of coccobacteria in purulent otorrhœa, etc. *Ibidem*, vol. x, p. 220.

55. B. WALB, Bonn. On the treatment of otorrhæa. *Deutsch med. Wochenschr.*, Nos. 31 and 32, 1881.

56. BURCKHARDT-MERIAN. Borated cotton in otorrhœa. *Correspondenzbl. f. Schweiz. Aerzte*, vol. xi.

57. E. DE ROSSI, Rome. On the use of resorcin in diseases of the ear. Preliminary paper. These ARCHIVES, vol. x, p. 242.

58. R. STEEL, Glasgow. Three cases of otorrhœa with destruction of drum-head. *Glasgow Med. Journ.*, No. 6, 1881.

59. GLAUERT, Berlin. On polypi of the mastoid process. *Arch. f. Ohrenheilk.*, vol. xvii, p. 277.

60. OSCAR WOLF. On the exfoliation of the necrosed small bones of the ear. These ARCHIVES, vol. x, p. 234.

61. F. BEZOLD, Munich. A new means for the extension of purulent inflammation from the cavity of the middle ear to the surrounding parts, and the therapy to be employed in such cases. *Deutsche med. Wochenschr.*, No. 28, 1881.

62. E. T. Ely. Pyæmia following a mastoid abscess; treated without medicine; recovery. These ARCHIVES, vol. x, p. 42.

63. HESSLER, Halle. Erosion of the internal carotid artery due to caries of the petrous bone. *Arch. f. Ohrenheilk.*, vol. xviii, p. 7.

64. HENRY SCHELL, Philadelphia. The cases of mastoid disease in children. *Am. Journ. of Otol.*, vol. iii, p. 207.

65. H. SCHWARTZE. Second series of 50 cases of trepanation of the mastoid process (continued). *Arch. f. Ohrenheilk.*, vol. xvii, p. 167.

66. LOUIS BLAU, Berlin. On the diphtheritic diseases of the ear in scarlatina. *Berl. klin. Wochenschr.*, No. 49, 1881.

67. H. N. SPENCER, St. Louis. Giddiness and middle-ear disease. *Amer. Journ. of Otol.*, vol. iii, pag. 187.

68. CHAS. H. BURNETT. A case of probable syphilitic deafness in one ear. *Ibidem*, vol. iii, pag. 199.

69. CHAS. J. KIPP. A case of epithelioma of the middle ear. These ARCHIVES, vol. x, pag. 206.

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49. BING goes into a detailed consideration of the diagnostic and therapeutic value of the common insufflations of air, and as-

pires to impart some further knowledge of the procedure and the mode of compression of the air. He is of the opinion that the entire pressure upon the elastic enveloping tissue of the tympanum only makes itself felt when the air contained in the mastoid cells has been compressed to a maximum degree. Bing believes that if the pressure is increased, it then affects the most elastic portion of the posterior superior quadrant of the drumhead, and then extends to the remainder of the elastic lining membrane.

50. SEXTON describes the common conditions of the drumhead in occlusion of the tympanal portion of the Eustachian tube.

51. LADREIT DE LACHARRIÈRE, first gives us a résumé of the anatomical changes which are based on those already given by Triquet and Toynbee. He attributes this condition, primarily to the different diatheses, such as the arthritic, the dartrous, and syphilitic. Rheumatism and gout, as well as certain neuroses, such as migraine, and those uterine affections which are often found simultaneously with aural affections, may be classed under the first heading. He has often observed that the manifestation of an aural affection corresponds with a disappearance of a rheumatism of the shoulders, etc. He has repeatedly found that there was a decided improvement of hearing as soon as pains in the neighboring organs subsided. The same obtains in the case of migraine. Lacharrière has repeatedly diagnosticated gout merely by an examination of the ear; the manubrium mallei is said to be greatly enlarged, without any other changes of the membrana tympani. In reference to the second class of disease, the author has often observed swelling of the chain of small bones, where there was eczema, and even pityriasis in the meatus. Here, also, Lacharrière thinks to have observed a peculiar condition of the malleus. Paracusis Willisiana is considered as pathognomonic of disease of the ossicula.

In accordance with these views, the treatment must be general, as well as local. The main feature consists in the administration of 0.5 of the iodide of potash daily. Politzer's douche charged with the vapor of iodine is recommended; this being generated by means of a Wolff's bottle, which is attached to the nose-piece of the air-bag.

55. WALB directs attention to the importance of applying treatment to purulent affections of the middle ear, and says that he recommended the use of antiseptics four years ago. At that time

he employed glycerine and carbolic acid (25: 1), but latterly has made use of Bezold's boracic acid treatment. Regard must be had to the fact that there may be a fermenting agent in acute as well as chronic inflammation of the middle ear. The secretion only becomes purulent when it comes in contact with air. Walb found that his therapeutic results confirmed his views. Several cases of acute purulent otitis media were speedily cured by the internal administration of large doses of salicylic acid. The author believes that, after the irritants which have caused inflammation have affected the superficies, they penetrate into the tissues, and that they may be destroyed by any substance which is antizymotic, and which circulates in the capillaries, and is contained in every cell. In order to prevent any further fermentation, care must be taken to remove all secretions, and this is best done by means of antiseptics.

If the mucous membrane is much thickened, it will take some time before the inflammation has subsided, and here it is that astringents and caustics are of service. In order to prevent any relapses, the mucous membrane should be made to sclerose, which can best be done by the caustic treatment (arg. nitr.—Schwartze). If this does not suffice, alum may be used; but this is contra-indicated if there be any caries, as in these cases alum will tend to increase the discharges.

56. Burckhardt-Merian has made borated cotton tampons containing 30% of acid to be used for purulent inflammation of the middle ear. The tampons are conical in shape and kept so by means of a thread which is wrapped around them.

58. The cases reported by Steel, and seen at Cassell's clinic, were simply chronic purulent middle-ear catarrh, two of them presenting no complication, the third presenting a polypus.

59. Glauert's case was that of a young man in whom a swelling of the superior wall of the meatus was noticed after an attack of acute otitis. A polypus soon made its appearance, the posterior wall and the mastoid processes being painful. The polypus was removed by means of a snare. Singular to say, careful probing failed to find any opening at the seat of the polypus; aside from a slight congestion, no change whatever. Glauert is, nevertheless, of the opinion that the polypus must have come from the mastoid process.

61. The clinical picture portrayed by Bezold's description of the extension of the otitis media is such, that we first have an acute

otitis, with pain over the mastoid, and inflammatory œdema. There is also quite a marked inflammatory infiltration of the posterior superior third of the osseous meatus. After the lapse of a few weeks or months, we have a sudden swelling of the mastoid region, which assumes the character of an inflammation of the muscles which are inserted there. The hard swelling extends to the retro-maxillary fossa and down the neck along the great vessels. We may now have a discharge of the accumulated pus at the junction of the cartilaginous and osseous portions of the auditory canal. The infiltration of pus may extend downward and backward to the median line, and be attended by occipital headache. Incision and drainage may effect a cure, else there will be a fatal issue, owing to exhaustion or to the hypostatic abscesses.

The purulent collections in the neck originate from the pneumatic cells of the mastoid process, the perforation being in the under table. Bezold found the inner plate of the mastoid reduced to a minimum thickness in 32 among 400 temporal bones examined; there was loss of tissue in 6 cases. In order to determine the exact course which the pus takes, Bezold perforated the mastoid process on its inner wall and injected colored fluids through it. The same swellings, already described in the living subjects, were observed.

Bezold suggests that in these cases the mastoid should not be opened in the usual manner, but instead of that the gauge should be applied to the lower border of the process, which can then be opened throughout its entire substance as far as the incisura mastoidea.

63. As an addendum to his own case, HESSLER gives a detailed description of erosion of the internal carotid artery, due to caries of the petrous bone. He also gives a complete list of all the cases previously reported. Fatal hemorrhage from the carotid was demonstrated in 13 cases, including his own. In 6 other cases, although not proven by necropsies, the hemorrhage, which was diagnosticated, was the probable cause of death. Hessler's own case is reported in detail, both the clinical and *post-mortem* conditions being given. The diagnosis of bilateral caries of the tympanic cavity was made during life, but there was no suspicion of the extensive changes which had taken place. The caries extended on both sides to the lateral sinus and to the middle cerebral fossa, but the pia mater was not affected. Although the left Fallopian canal was entirely destroyed throughout its extent, and the

facial nerve completely exposed, there were no signs whatever of facial paralysis. On the right side, where the hemorrhage occurred, there was, just where the carotid curves, an opening 4 *mm.* long and 2 *mm.* broad. The bony wall was composed of a number of very thin and projecting sequestra.

It appears that in the majority of cases the first hemorrhage set in without any assignable cause. Only in one instance was it determined that it was due to a slight coughing fit, which was unattended by any earache. The walls of the carotid were softened and broken down, to a greater or less extent, in every case. Hessler contends, therefore, that, sooner or later, the impact of the pulse-wave in itself suffices to perforate the coats of the vessel. In one case only did the first hemorrhage prove fatal. The artery was ligated in three cases: in one of these the common carotid was tied; death ensued three days later from secondary hemorrhage. In the second case the right internal carotid was tied; no further bleeding, but the case terminated fatally, four weeks later, from pulmonary tuberculosis. In the third case the two common carotids were ligated successively. This case terminated fatally three days after the last operation.

Although the prognosis is a very unfavorable one, the carotids must, nevertheless, be ligated, and, as a rule, if there be considerable hemorrhage, the common carotid should be selected.

64. In two of the three cases of mastoid disease in children, the cortex of the mastoid process could be opened with a probe alone; this was followed by a speedy recovery. In the other case a large, free incision was made, and a large sequestrum found which could not be removed; it was touched daily with a pledget soaked in sulphuric acid. Three months elapsed before the case was entirely cured.

65. SCHWARTZE adds, to those already reported, the histories of seven cases of artificial perforation of the mastoid process; two were simply dilatation of extending fistulæ, three removal of sequestra in children. All of the latter terminated fatally, in consequence of pulmonary tuberculosis, pneumonia, and tubercular meningitis. In another case there was an abscess in the mastoid preceded by acute otitis, with œdema of the surface. A simple superficial incision sufficed to evacuate a torrent of pus; speedy cure. In the last case a depression of the mastoid, due to a former caries, was reopened, and a large quantity of cheesy matter removed from the antrum.

66. BLAU reports a case in which scarlatina was followed by diphtheria of the middle and external ears. This was complicated by transitory facial paralysis and total deafness, abscess and caries of the mastoid. Another physician was compelled, later, to trephine the mastoid. The author also summarizes the different views advanced about aural diphtheria.

67. SPENCER reports several cases in which he was able to remove the different symptoms characterizing Ménière's disease, by treating otitis media, which was the exciting cause. If he thinks that every impairment of coördination is due to alteration of the intralabyrinthine pressure, he is greatly mistaken, for it must not be forgotten that disease of the cerebellum also causes similar disturbances.

68. BURNETT reports a case, affecting a syphilitic patient, who, without any premonitory symptoms, awoke one morning to find that he was quite deaf on one side and affected with distressing noises. The tuning-fork, when applied to the vertex was heard equally well on both sides; voice heard close to the affected ear. Burnett considers himself justified in classing this among the syphilitic diseases of the middle ear.

NERVOUS APPARATUS.

70. Prof. LUCAE. Diseases of the labyrinth. *Eulenberg's Real-Encyclopædie*, vol. viii.

71. LADREIT DE LACHARRIÈRE. Otitis labyrinthica. *Ann. des Mal. d' Oreille*, 1881, p. 277.

72. D. B. ST. JOHN ROOSA. The clinical diagnosis of neuritis and atrophy of the acoustic nerve. These ARCHIVES, vol. x, p. 210.

73. AUGUST LUCAE. On optical vertigo and increased intralabyrinthine pressure. *Arch. für Ohrenheilk.*, vol. xviii, p. 237.

74. AUGUST LUCAE. Ménière's disease *Eulenberg's Real-Encyclop.*, vol. viii.

75. A FÉRÉ and A. DEMARS. On Ménière's disease and especially its treatment according to Charcot's method. Reprint from *La Revue de Médecine*, Paris, 1881.

76. S. MOOS. A case of double labyrinthine affection, with staggering gait and permanent abolition of hearing after mumps. These ARCH., vol. xi, p. 13.

77. C. KELLER, Cologne. Contribution to the history of acquired deaf-mutism. *Berl. klin. Wochenschr.*, No. 40, 1881.

78. P. McBride, Edinburgh. Nervous deafness. *Lancet*, 1881.

79. Lancereaux. Syphilitic paralyses. *Revue médic. française et étrangère*, No. 46, 1881.

80. Thomas Buzzard, London. On certain little-recognized phases of tabes dorsalis. *The Lancet*, Sept. 24, 1881.

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70. The chapter on diseases of the labyrinth in *Eulenberg's Encyclopædie* is written by Lucae, and contains a satisfactory summary of the different diseases. In the pathologico-anatomical part he accepts Schwartze's division, adding to them all new and original contributions. Among the latter we must mention those on the extension of otitis media purulenta to the posterior cranial fossa, which Lucae observed. It had extended from a crater in the labyrinth, which was almost *2 cm.* in diameter and filled with granulation tissue.

Physical diagnosis is fully elaborated. Lucae recommends, for the diagnosis of unilateral, total deafness, that a large, deep-toned tuning-fork be firmly inserted into the external meatus of the diseased ear. If this ear is totally deaf the vibrations will only be heard on the other side. The author directs attention to the unsatisfactory results of the objective examination of the external and middle ear. He has derived the best results by utilizing Rinne's experiment, in conjunction with the determination of the range of perception of high and low tones. If the sound of a tuning-fork (C) is still heard in front of the ear after its vibrations are no longer perceived on the vertex, then we can say that the transmitting apparatus is still able to perform its functions, and the disease must be sought for in the internal ear. If, however, the tone is heard longer on the mastoid process than before the ear, there must be a marked affection of the transmitting apparatus. For the more exact determination of the range of hearing the chronoscope answers best. Among 25 patients, in whom disease of the transmitting apparatus was diagnosed, by the above method, Lucae removed the entire drum-head and the malleus. In none of these cases did the deafness increase, and in several of them a considerable improvement was observed. Lucae also discusses the necrosis, injuries, inflammations, and syphilitic diseases of the labyrinth.

71. In his treatise on otitis labyrinthica Lacharrière gives us quite an elaborate summary of the views now held upon this af-

fection. As far as the acute form is concerned he accepts Voltolini's explanation. In the chronic form, he says that he has achieved satisfactory results by cauterizing the mastoid process, and, especially so, by inserting setons into the neck, in conjunction with the internal exhibition of antispasmodics, or the iodide or bromide of potassium or arsenic.

73. This article of LUCAE'S contains little that we have not already noticed in our last report.

74. LUCAE begins his article on Ménière's disease by discussing the physiological experiments of Flourens, Czermak, Goltz, and others, and directs especial attention to the conclusions, which differ from those arrived at by Böttcher, who attributes the disturbances of coördination noticed after injuries of the semicircular canals to simultaneous affections of the brain. According to Lucae's observations, and Baginsky's experiments, it appears to him rather probable, that it is the pressure in the labyrinth increased by a sudden hemorrhagic effusion into it; but this is also the case in the brain, and, in consequence thereof, the vertiginous symptoms are observed. In one case Lucae found the changes in the labyrinth described by Ménière, but none of the symptoms characteristic of the disease. The deafness occurred suddenly after an attack of meningits. Lucae attributes the absence of the symptoms of Ménière's disease to the fact, that the pressure on the brain was primarily changed by the meningitis.

75. This paper is mainly devoted to a consideration of Charcot's method of treating Ménière's disease. We have the detailed accounts of seven cases, and a plate containing three tracings showing the benefit derived from the quinine treatment. The treatment applied consists of the administration of from 60–80 *cgrm.* of quinine daily, in doses of 0.1 *grm.* This is given for 8–14 days, consecutively, then the treatment is suspended for an equal length of time, and after this the medicine is again given, the same as before, until the desired effect is attained. At first the noises are always increased, and even the vertigo and the falls may recur. During the first interval a considerable diminution of the tinnitus is generally noticed. Further improvement continues during the following stages of treatment. At last the vertigo disappears altogether, and only slight and occasional noises continue.

It is rather singular that the authors, while discussing the Ménière's symptoms, which are caused by peripheric lesions, do

not mention local treatment at all, and that, when speaking of the severe forms of the disease, they say, that " the disease continues until the deafness is complete."

77. KELLER describes a case of acquired deaf-mutism arising from an illness of 4 days' duration, which was attended by intense fever and mild cerebral symptoms. After this, total deafness and an irregular gait remained. Two weeks later, facial paralysis of one side appeared, which, however, soon disappeared. Keller believes that there had been an otitis labyrinthica, and accounts for the paralysis, by the fact that the facial nerve had become affected in consequence of the inflammation of the labyrinth. This appears to him to be the correct diagnosis, as there were no severe cerebral symptoms (there had been obstinate vomiting, sluggish bowels, and some clouding of the mind). As mild cases of meningitis are frequently observed, Keller's solution is hardly satisfactory. Nor can the author's conclusion, that deafness very rarely ensues after cerebro-spinal meningitis, be accepted as correct (REVIEWER).

78. MCBRIDE believes that as we attribute epilepsy and other neuroses to unknown disturbances of the nervous centres, we may also in some cases of deafness acknowledge our inability to determine their pathology. We should also remember that it is possible that deafness may be due to purely functional disturbances of the auditory nerve. These cases are generally observed when the rest of the nervous system is also out of order.

79. LANCEREAUX made a diagnosis of syphilitic tumor of the brain, in a patient who had marked anæsthesia of the eye, cheek, nose, and right half of the tongue, combined with facial paralysis of that side, deafness, and impaired co-ordination. This simultaneous paralysis of the 5th, 7th, and 8th pairs of nerves could only be caused by some affection of the posterior surface of the petrous bone in the vicinity of the apex, where these nerves are nearer together. The diagnosis was confirmed at the autopsy, when a fibrous mass was discovered, which extended from the apex of the petrous bone to the meatus auditorius internus. The nerves were enveloped in the fibrous mass, and the meninges of the brain were adherent to the cerebellum.

80. BUZZARD says that Duchenne, Remak, Tobinard, and others have already pointed out that the acoustic nerve may also be affected in tabes dorsalis. But no one suspected the frequency of this complication until Pierrot called attention to it. Since

then McBride has always found a greater or less degree of deafness, though, sometimes, only transitory in its appearance, in every case that came under his observation. Ormerod observed this symptom in 5 out of a total of 13 cases. McBride thinks it possible that the affection of the acoustic nerve may in some cases be a leading symptom, just as in others the optic nerve may be affected, and presumes that certain cases of "nervous deafness" may be accounted for by the presence of tabes dorsalis.

NOSE AND NASO-PHARYNX.

81. GOTTSTEIN, Breslau. Diseases of the nose. *Eulenberg's Real-Encyclopædie.*

82. VICTOR LANGE. The use of the galvano-cautery in the nose and pharynx. International Medical Congress, London, 1881.

83. LÖWENBERG. Contribution to the treatment of simple chronic nasal catarrh. *L' Union Médicale*, No. 104, 1881.

84. GOTTSTEIN. On idiosyncratic asthma. *Breslauer ärztl. Zeitschr.*, No. 15, 1881.

85. WALB, BONN. On the etiology of nasal blennorrhœa. *Arch. für Ohrenheilkunde*, vol. xvii, p. 265.

86. R. CALMETTE. On true ozæna. *Le Progrès Médical*, No. 41, 1881.

87. EDOUARD FOURNIÉ. On the nature of ozæna and its treatment. Intern. Med. Congress. *Revue Médicale*, No. 36, 1881.

88. R. CALMETTE. On nasal hemorrhages. *Le Progrès Médical*, No. 40, 1881.

89. A. WEICHSELBAUM, Vienna. Phlegmonous inflammation of the cavities connected with the nose. *Wien. medic. Jahrbücher*, 1881, p. 227,

90. V. LANGE. On nasal polypi. Copenhagen, 1881.

91. F. KIELLMANN. The operation for nasal polypi. *Hygiea* Stockholm, vol. xliii, No. 6, 1881.

92. GUYE, Amsterdam. Adenoid vegetations in the naso-pharynx. Internat. Medical Congress, London, 1881.

93. BEZOLD, Munich. On the operative treatment of adenoid vegetations in the naso-pharynx. *Aertzl. Intelligenzbl.*, No. 14, 1881.

94. I. WIESNER, Bergen. Adenoid vegetations in the naso-pharynx. Stockholm *Nord. med. Archiv*, vol. xvi, No. 4.

95. CINON. Naso-pharyngeal polypi. *Gazette des Hôpitaux*, No. 73, 1881.

81. GOTTSTEIN gives a succinct sketch of nasal diseases. In the introduction he discusses the different methods of examination, and particularly that through the anterior nares. Among the symptoms he lays particular stress upon the importance of stenosis.

After this we have a description of the different diseases, beginning with acute coryza. In treating this Gottstein has been able to cut it short by ordering insufflations of salicylic acid. Rhinitis acuta blennorrhoica is a disease which is characterized from its beginning by a purulent secretion, and is either due to infection (gonorrhoic matter, blennorrhoic secretion *inter partum*) or to some dyscrasia. Gottstein is not in favor of considering chronic nasal catarrh as dyscrasic.

In the chapter on the pathologico-anatomical changes we fail to find mention of Steinbrügge's careful investigations, while E. Fränkel's and Krause's views of ozæna are given in detail.

In accordance with his previous writings, Gottstein differentiates between an exudative stage of chronic catarrh and the period of retrograde metamorphosis, atrophy of the mucous membrane, the latter corresponding with ozæna.

In conclusion we have a brief review of syphilitic and tuberculous nasal affections, as well as neoplasms and foreign bodies.

82. LANGE gives us a summary of the usual methods of employing the galvano-cautery in the different diseases of the pharynx and nose.

83. LÖWENBERG insists upon the importance of the galvano-caustic treatment of chronic nasal catarrh. In order to prevent any injury of the adjoining parts, especially of the nasal septum, he makes use of a new cautery. The part which is to be heated is placed on the side, and not on the end, of the cautery, and consists of a raised piece of platinum. Löwenberg thinks it very important that this instrument should be employed when there are small spinous projections of the septum, which must always be injurious when the usual instruments are used. This instrument can also be used for reducing the size of hypertrophied tonsils.

84. One of GOTTSTEIN'S patients suffered from chronic coryza and asthmatic attacks, which invariably set in when he came near ipecac. The attacks began with repeated sneezing, which was followed by profuse discharge from the nose. In order to determine whether the asthma was due to the irritation of the nose, Gottstein filled the nostrils with cotton; thereupon the attacks

were greatly lessened in severity, and often did not appear at all. This is not absolutely conclusive, as the posterior nares were not tamponed.

85. WALB makes a brief report of a case in which a carious tooth extended into the antrum of Highmore, causing a purulent inflammation of this cavity, which extended into the nose. Any sudden movement of the head, or any bending forward, caused a flow of pus into the nasal cavity; but only on that side corresponding to the diseased tooth. After extraction of the tooth, a probe was easily passed into the antrum through the alveolus. There was a continuous trickling of pus through the fistula, which was not checked for some time.

86. CALMETTE gives a *résumé* of the most recent views on ozæna. He agrees with Zaufal, who attributes the disease to abnormal size of the nasal cavity.

87. FOURNIÉ also gives a summary of the different explanations of the etiology of ozæna now most in vogue. He does not endorse Zaufal's views, but believes that the odor of ozæna is caused by the accumulation of the secretion of the muciparous glands, and that it is the peculiarity of the patient which causes a pathological secretion from the glands, just as in other organs we may have abscesses, diseases of bone, etc. The nature of the secretion is determined by a specific alteration of the glandular substance. There must, therefore, be a constitutional cause for the disease. Fournié recognizes two types of ozæna, the dry and the moist. In order to improve the general condition, he employs, in the moist form, sulphur baths, and in the dry form, alkaline baths which are alternated with arsenical baths. For local treatment, he employs Gottstein's tampons; and solutions of boracic acid and salicylate of soda for the removal of the fetid odor.

88. In one of CALMETTE'S patients who suffered from repeated nasal hemorrhages, ozæna and a number of small polypi were found. The removal of the latter had no effect on the epistaxis. After the next hemorrhage Calmette found a number of bloody streaks on the inner surface of the nostril. Removing these he saw a small black spot, from which, when touched with a probe, arterial blood issued. Cured by means of the galvano-cautery.

89. WEICHSELBAUM has seen five cases of phlegmonous inflammation of the pneumatic cavities connected with the nose, *i. e.*, of the antrum of Highmore, the frontal sinuses, the sphenoidal and ethmoidal cells.

Phlegmonous inflammation of these cavities may be divided into two categories: in one the exudation is of a serous nature throughout (acute œdema), and in the other principally fibrinous. It is the latter which concerns us here. When the phlegmonous process is at its height, spherical or semi-spherical infiltrations are found studding the mucous membrane and making the surface uneven. These are simply called plaques. Their contents are fibrinous masses mingled with a purulent fluid. The mucous membrane lying between the plaques is more or less inflamed. The cavities are filled with a variable quantity of muco-pus. The inflammation was always greatest in the maxillary antrum. The changes found in the nasal cavity were hardly of any consequence.

Under the microscope, cellular infiltrations were found first; fibrinous deposits later: both of these in foci, attended with enormous dilatation of the vessels and numerous sanguineous extravasations. The larger plaques contain a fibrinous exudation. If this be purulent, it will be filled with micrococci, which are also found in the adjoining cavities.

In two of the cases under consideration the disease was primary in one doubtful, and in the other two secondary.

In the primary cases the disease progressed with unusual rapidity and fatality, the patients dying within two and four days respectively. On *post-mortem* it was found that the spine was enlarged, and also the liver and kidneys; there were ecchymoses on the pericardium and pleura.

Weichselbaum does not consider himself justified in terming the disease an erysipelatous inflammation.

90. Lange gives a summary of the most common methods of treating nasal polypi, and appends the history of five cases. We also find an illustration of a modification of Wilde's snare.

91. Kiellmann makes a few remarks on the application and utility of the wire snare.

92. In order to prevent the development of adenoid vegetations and to hinder a renewed growth after operation, Guye advises that a "contra-respirator," preventing the entrance of air, be worn day and night. For operative purposes the finger nail should be used, which will generally answer every purpose.

93. Bezold employs Wilde's snare, which is passed in through the nose. He makes use of the stiff steel wire, so that the loop can retain its original shape. By this means he has repeatedly

been able to remove proliferations from the lateral walls of the naso-pharynx. In the case of children, or when the passages are greatly constricted, he uses an artificial finger nail, a sharp spoon, which is put on the distal phalanx of the finger.

94. WIESNER'S monograph is based on previous papers on the same subject. We also find the histories of several cases. He is inclined to believe that the scrofula which often attends adenoid vegetations should be considered as an effect and not as the cause of the disease.

95. CINON removed a naso-pharyngeal polypus by securing the pharyngeal portion with a suture passed through the mouth; then a thread was introduced by means of a Bellocq's canula through the nose, passed around the root of the polypus, and attached to the chain of an ecraseur. The ecraseur divided the growth from its attachments by linear incision. Only slight hemorrhage followed, and the polypus, which was myxomatous, was drawn out through the mouth.

MISCELLANEOUS NOTES.

The American Otological Society will meet at the Fort William Henry Hotel, Lake George, N. Y., on July 25th.

Prof. Politzer, of Vienna, informs us that the second volume of his text-book is completed, and will be issued about June 15th.

Dr. Edward Woakes, so well known by his work on "Deafness, Giddiness and Noises in the Head," has been appointed senior aural surgeon to the London Hospital.